

ENGINEERING HERITAGE PANEL.
I.E. Aust. N.O.

- 7 AUG 1997



The
Institution
of Engineers,
Australia

WESTERN AUSTRALIA
DIVISION

Monday 4th August 1997.

File

Ms Penny Sutherland,
Secretary,
National Committee on Engineering Heritage,
The Institution of Engineers, Australia,
Engineering House,
11 national Circuit,
ACT. 2600.

PERTH WIRELESS STATION PLAQUING REPORT.

Dear Penny,

Here is the long overdue Report on the Plaquing Ceremony for the Perth Wireless Station which event took place on Monday 24th October 1994.

The following are enclosed:-

1. Copy of the Programme of the Ceremony.
2. An Official Invitation Card.
3. A copy of the Acceptance List.
4. A copy of the Apology List.
5. A copy of the Address by Mr Bruce James.
6. A copy of the Address by the Hon, Richard Lewis.
7. A copy of the Acceptance Address by the Mayor of the City of Melville.
8. Three photographs of the Plaque which was not mounted until some twelve months after the Ceremony.

Please let me know if you require any further information.

Yours sincerely,

Bruce W S James.
Chairman,
Engineering Heritage Panel.

IEH70804.

PERTH WIRELESS STATION PLAQUING REPORT.

On Monday 24th October 1997, some sixty people assembled at the base of the original mast when the Historic Engineering Marker Plaque was presented to Her Worship the Mayor of the City of Melville, Mrs June Barton, by Professor Douglas Clyde, the President of the Institution of Engineers, Australia.

Addresses were given by Mr Charles Waterton, the President of the WA Division of the Institution, Mr Bruce James, the Chairmen of the WA Division Engineering Heritage Panel and the Hon. Richard Lewis MLA, Minister for Heritage and Member for Applecross.

The attached photographs and copies of Addresses, Invitation Lists etc. cover the event.

A handwritten signature in dark ink, appearing to read 'B. James', with a horizontal line extending to the right.

Bruce W S James.
Chairman,
Engineering Heritage Panel.

4th August 1997.

IEH70804.

SPEECH NOTES — **Bf. Hon. RICHARD LEWIS.**
UNVEILING OF PLAQUE FOR "PERTH WIRELESS
STATION"
WIRELESS HILL
MONDAY OCTOBER 24

+ It is a pleasure to be here today to commemorate the valuable contribution the Wireless Hill station has made to Western Australia and Australia's communications history.

+ I am sure that few people in Western Australia -- outside of those gathered here -- have a complete grasp of the remarkable history of Wireless Hill.

+ Even many local residents probably take it for granted.

+ Yet this site has been witness to many of the extraordinary developments in the world's communications industry, from the earliest, tentative establishment of wireless communications to the space-age era of satellites.

+ It has also played a vital role in the safety of ships at sea, in police communications and as a control centre for the State Emergency Service.

+ It was also used for the broadcasting of commercial radio 6PR way back in 1931.

+ An indication of the rich history of Wireless Hill is that it was commenced in 1912 -- just 18 years after Marconi's first radio transmission.

+ While talking of Marconi, may I point out there is a special link with him present today. Bruce James, the chairman of the Engineering Heritage Panel of the Institution of Engineers, is the grandson of Llewelyn Atkinson, who worked with Marconi in those early days.

+ I am told Mr Atkinson climbed the hills of Wales with Marconi the day the first signal was sent the 9 miles across the Bristol Channel.

+ The buildings here remain intact from the commencement of the station in 1912.

+ Operations began under the control of the Postmaster General's Department and it provided the first direct telegraphic communication across Australia and with off-shore shipping.

+ During World War 1, the Australian Navy took over control and upgraded the transmitter.

+ Control returned to the Postmaster General's Department in 1920 and then passed to Amalgamated Wireless Australia (AWA) - an important company in the development of this country's communications industry.

+ In this period it became a feeder station for international radiograms and from 1943 it was used as an alternative station for international shortwave radio messages.

+ Control of the station shifted again in 1947 to the Overseas Telecommunications Commission, until its decommissioning in 1967. During this period two rhombic antennae were used for the NASA Space Mission communications

+ As you can see, from its earliest days it played a vital role in linking Australia to the world by radio -- and in communication across Australia.

+ It's importance is underlined by the fact that this is only the fourth time since 1986 that an Engineering site in Western Australia has been recognised in this way by the Institution of Engineers.

+ The others are the Kalgoorlie pipeline, the Fremantle Harbour complex and the Forts at Albany. This gives you some indication of the importance of the Wireless Hill station.

+ I hope the unveiling of the plaque today will generate interest in the history of Wireless Hill and lead to an increase in visitors to the well-maintained and interesting telecommunications museum here.

+ I congratulate the Institution of Engineers for their work in recognising the importance of Wireless Hill and the work they have done in preparing for today's ceremony.

Thank You.

HISTORIC ENGINEERING MARKER CEREMONY
WIRELESS HILL PARK
MONDAY, OCTOBER 24/1994 AT 5.30 PM.

SPEECH by The Mayor of Melville

DISTINGUISHED GUESTS, LADIES AND GENTLEMEN. IT IS INDEED AN HONOUR FOR ME TO ACCEPT ON BEHALF OF THE COUNCILLORS AND THE RATEPAYERS OF THE CITY OF MELVILLE THIS HISTORICAL ENGINEERING MARKER.

I THANK PROFESSOR DOUG CLYDE AND ALL MEMBERS OF THE AUSTRALIAN INSTITUTION OF ENGINEERS, FOR NOT ONLY ACKNOWLEDGING THE SKILLS OF OUR EARLY RADIO PIONEERS BUT FOR RECOGNISING THE TREMENDOUS HERITAGE VALUE OF OUR WIRELESS HILL.

PAGE 2.

AS MR BRUCE JAMES SAID ONLY THREE OTHER PROJECTS HAVE BEEN RECOGNISED FOR THEIR ENGINEERING EXPERTISE AND HERITAGE VALUE. I AM PROUD TO SAY THAT TODAY OUR WIRELESS HILL HAS BEEN LIFTED UP AND PLACED ALONG SIDE PROJECTS SUCH AS THE GOLDFIELDS PIPE LINE, THE FREMANTLE HARBOUR, AND THE FORTRESS AT ALBANY.

LADIES AND GENTLEMEN, IT IS IMPORTANT THAT WE ALL UNDERSTAND FULLY THE HERITAGE VALUE OF SUCH PROJECTS. THE WORD HERITAGE IS DEFINED IN THE DICTIONARY, AS: "PROPERTY DESCENDING TO AN HEIR".

TOGETHER WIRELESS HILL AND OTHER PROJECTS WITHIN THE CITY BOUNDARIES, HAVE ENSURED THAT PROPERTIES WILL INDEED DESCEND TO OUR HEIRS - OUR YOUNG CITIZENS OF TOMORROW.

PAGE 3.

- * THE AIRFORCE MUSEUM AT BULL CREEK,
- * THE MILLERS BAKEHOUSE IN PALMYRA,
- * THE TIME CAPSULE BURIED IN THE CIVIC SQUARE IN 1988, WHICH IS TO BE DUG UP AGAIN IN THE YEAR 2088,
- * THE ESTABLISHMENT OF A LOCAL HERITAGE AND MUSEUM SERVICE LOCATED NEXT TO THE CIVIC CENTRE LIBRARY, ARE ALL WORTHWHILE PROJECTS.

WIRELESS HILL WAS REVITALIZED IN 1992 WHEN CR CHRIS STONE ALONG WITH MEMBERS OF THE WIRELESS HILL TELECOMMUNICATION MUSEUM ADVISORY COMMITTEE, BROUGHT TOGETHER A CELEBRATION FOR THE 80TH ANNIVERSARY OF TELECOMMUNICATION AT WIRELESS HILL. THE CELEBRATION WAS CALLED "TALKING TO THE WORLD" WHICH WE DID WITH A VERY CLEAR LINE LINKING US HERE AT WIRELESS HILL WITH NASA IN THE USA, A RUSSIAN SPACE CRAFT, MELVILLE IN CANADA, MELVILLE IN NEW ZEALAND, AND FREMANTLE.

PAGE 4.

CHILDREN FROM LOCAL SCHOOLS WERE ALSO INVOLVED ON THE DAY, TAKING PART IN A LINK UP WITH THE SCHOOL OF THE AIR IN MEEKATHARA.

THE CELEBRATION WAS A GREAT SUCCESS THANKS TO THE TIRELESS WORK OF CR STONE AND THE ADVISORY COMMITTEE, AND THE SPONSORSHIP OF TELECOM.

WHILE IT IS IMPORTANT FOR US ALL TO LOOK TO THE FUTURE WITH NEW IDEAS AND GOALS IT IS ALSO ESSENTIAL THAT WE, AND FUTURE GENERATIONS, LOOK BACK FROM TIME TO TIME TO RECOGNISE AND BE REMINDED OF OUR PAST, BECAUSE ONLY THEN CAN A TRUE SENSE OF ACHIEVEMENT BE ACKNOWLEDGED.

PAGE 5.

TODAY WE HAVE ADDED ANOTHER PROPERTY FOR OUR HEIRS. I CONGRATULATE THE EARLY PIONEERS AND ALL CONCERNED WITH THE OPERATION OF THIS SITE SINCE ITS OPENING IN 1912. WE ARE EXTREMELY PROUD TO HAVE RECEIVED THIS AWARD AND I THANK THE AUSTRALIAN INSTITUTION OF ENGINEERS AND ASSURE YOU THAT WIRELESS HILL WILL REMAIN AN IMPORTANT AND INTEGRAL PART OF THIS CITY'S HERITAGE PROGRAMME.

LADIES AND GENTLEMEN THIS CONCLUDES THE FORMALITIES AND I INVITE YOU ALL TO PARTAKE IN THE CITY'S HOSPITALITY.

+HER/4. ADDRESS GIVEN BY MR BRUCE JAMES, CHAIRMAN OF THE
ENGINEERING HERITAGE PANEL OF THE WA DIVISION.

MR CHAIRMAN, AND DISTINGUISHED GUESTS.

THANK YOU FOR YOUR INTRODUCTION, CHARLES.

WE ARE ALL WELL AWARE OF THE GREAT WORK THAT HAS BEEN ACCOMPLISHED BY THE NATIONAL TRUST OF AUSTRALIA IN LISTING AND IN SOME CASES OWNING AND MAKING AVAILABLE TO THE PUBLIC, BUILDINGS AND PLACES OF GREAT HISTORIC SIGNIFICANCE.

WE CONGRATULATE AND THANK THEM FOR THE WORK THEY HAVE DONE IN THE PAST AND ARE CURRENTLY DOING.

IN PARTICULAR, WE NOTE THAT THEIR ACCENT HAS BEEN DIRECTED TOWARDS THE ARCHITECTURAL FIELD.

AT THE OTHER END OF THE SPECTRUM, WE HAVE THE MUSEUMS WHO HAVE DONE AN EQUALLY GREAT JOB IN COLLECTING AND DISPLAYING THE ARTIFACTS THAT WERE USED IN BYGONE DAYS.

BUT IN BETWEEN THESE TWO EXTREMES THERE SEEMS TO BE A GAP, OR WE MIGHT SAY, A VACUUM.

I REFER TO THE INDUSTRIAL HERITAGE OF WHERE PEOPLE WORKED AND THE MACHINERY THEY OPERATED, BE IT IN THE AREAS OF MINING, AGRICULTURE, FORESTRY, MARITIME OR THE MANUFACTURING FIELDS.

TO THIS, WE CAN ALSO ADD THE SERVICE INDUSTRIES SUCH AS ROADS, RAILWAYS, WATER, ELECTRICITY AND COMMUNICATIONS, TO NAME BUT JUST A FEW WHICH ENABLED THESE INDUSTRIES TO DEVELOP.

IT IS IN THIS AREA OF INDUSTRIAL HERITAGE THAT SO MUCH OF THE WORK WAS PLANNED, DESIGNED, CONSTRUCTED, OPERATED AND MAINTAINED UNDER THE DIRECTION OF ENGINEERS.

THE INSTITUTION OF ENGINEERS, AUSTRALIA, HAS SEEN FIT TO RECOGNISE THOSE ITEMS, SITES AND STRUCTURES WHICH HAVE MADE SUCH A LARGE IMPACT ON THE DEVELOPMENT OF AUSTRALIA.

SOME TEN YEARS AGO, IT INITIATED A PROGRAMME OF IDENTIFYING THE REALLY HISTORICALLY SIGNIFICANT ENGINEERING WORKS THROUGHOUT THE COUNTRY AND, IN AGREEMENT WITH THE OWNER, TO PRESENT A SUITABLY WORDED COMMEMORATIVE PLAQUE FOR PUBLIC RECOGNITION OF THE CHOSEN WORK.

ONE SUCH PLAQUE IS CALLED AN "HISTORIC ENGINEERING MARKER" AND IT IS ONE OF THESE PLAQUES THAT WILL BE PRESENTED TODAY.

THE WORDING ON THE PLAQUE NEEDS TO IDENTIFY IN SEVENTY WORDS

WHAT IT IS.

WHO DID IT.

ITS ENGINEERING SIGNIFICANCE.

ITS SOCIAL IMPACT.

HISTORIC SIGNIFICANCE IS NOT A QUALITY THAT CAN BE EASILY EVALUATED.

NOT ONLY MUST THE SPECIFIC MERITS OF A NOMINATED WORK BE ASSESSED, BUT IT MUST ALSO BE COMPARED WITH OTHER SIMILAR ITEMS.

SPECIFIC CRITERIA ARE DIFFICULT TO FORMULATE AS SOME WORKS MAY BE HIGHLY SIGNIFICANT IN A LOCAL CONTEXT BUT NOT ON A NATIONAL OR INTERNATIONAL LEVEL.

HAVING EXPLAINED THE RAMIFICATIONS OF THIS PLAQUING CEREMONY, IT IS NOW MY PLEASING DUTY TO INVITE THE HON. RICHARD LEWIS MLA JP, MINISTER FOR PLANNING AND HERITAGE, AND MEMBER FOR APPECROSS TO GIVE US SOME IDEA AS TO THE ACTUAL HISTORIC SIGNIFICANCE OF THIS WIRELESS STATION WHICH WAS INITIALLY KNOWN AS THE "PERTH WIRELESS STATION".

HE HOLDS THESE TWO VERY IMPORTANT ROLES IN THE GOVERNMENT OF OUR STATE.

BOTH PORTFOLIOS INVOLVE A GREAT DEAL OF CAREFUL STUDY AND CONSIDERED DECISION MAKING IN AREAS THAT WILL HAVE A GREAT IMPACT ON THE FUTURE OF OUR STATE. IT IS NOT AN EASY ROLE TO TAKE ON.

I AM PERSONALLY VERY MUCH AWARE OF HIS CONCERN, DEDICATION AND INTEREST IN THE FIELD OF HERITAGE.

HOWEVER, THIS IS ONE HERITAGE MATTER ON WHICH HE HAS NOT HAD TO EXERCISE HIS OFFICIAL POSITION AND MAKE A DECISION EXCEPT TO SAY THAT HE WILL BE WITH US TODAY.

THANK YOU FOR BEING WITH US, RICHARD.

LADIES AND GENTLEMEN....I GIVE YOUTHE HON RICHARD LEWIS.

IEH41024.

HISTORIC ENGINEERING MARKER CEREMONY.

WIRELESS HILL PARK

MONDAY, OCTOBER 24/1994 AT 5.30 PM.

ACCEPTANCE LIST

POLITICIANS

The Hon K R Lewis MLA
Member for Applecross

PO Box 290
APPLECROSS WA 6153
Ph: 364 4877
Fax: 364 8274

ELECTED MEMBERS

Cr Lorraine Kelly & Dr Wal Howse

Cr Shirley de la Hunty

Cr Chris Stone & Mrs Barbara Stone

Cr John & Lorraine Papaphotis

Cr Patricia Phelan & Son

FREEMAN OF THE CITY:

Mr Harry STICKLAND AM and
Mrs Rae STICKLAND
TC. 1961-1968: CR.1968-1986

5 Cann Road
ATTADALE WA 6156

STAFF

John McNally

Neil Bolton

Ron Hurst

Lesley Solley

Denise Cook

Chief Executive Officer

Acting Executive Manager Community Services

Manager Community Development

Senior Recreation Officer

Local Heritage Officer

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MELVILLE HISTORICAL SOCIETY

Mr Don Shiels & Mrs Ellen Shiels
Secretary

161 Riseley Street
BOORAGOON WA 6154

INVITATION LIST FROM AUSTRALIAN INSTITUTION OF ENGINEERS.

Prof Doug Clyde
National President
Institute of Engineers Australia

C/o Department Civil & Environmental
Engineering
University of Western Australia
NEDLANDS WA 6009

INVITATION LIST FROM AUSTRALIAN INSTITUTION OF ENGINEERS.WA DIVISION

Mr Charles Waterton
President
WA Divison
Institute of Engineers Australia

19 Josephine Crescent
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Mr Tony Field
Vice President

9 Vaucluse Avenue
CLAREMONT WA 6010

Mr Andrew Yuncken

1 Patonga Road
CITY BEACH WA 6015

Mr Richard Usher
Director

11 Seahaven Street
SAFETY BAY WA 6161

Mr Bruce James
Chairman
WA Engineering Heritage Panel

27 Strome Road
APPLECROSS WA 6153

Mr Denis Cumming
Secretary
WA Engineering Heritage Panel

83 Beamish Avenue
BRENTWOOD WA 6153

Mr Werner Corbe

C/o City of Melville

Mr Richard Hartley

14 Hurley Way
BULL CREEK WA 6149

Mr Bill Larke

4 Vaughan Street
DIANELLA WA 6062

Mr Peter Lowe

161 Ewen Street
DOUBLE VIEW WA 6018

Mr Lloyd Margetts

17 Serrata Crescent
FERNDAL WA 6148

Page 3.

Mr John Moynihan

3 Partlet Road
DUNCRAIG WA 6023

Mr Jim Paton

46 View Street
PEPPERMINT GROVE WA 6011

Mr Ron Strickland

28 Modillion Avenue
SHELLEY WA 6155

Mr Tony Moulds

8 Warrigal Way
GREENWOOD WA 6024**ELECTRICAL ENGINEERING PANEL INSTITUTION OF ENGINEERING AUSTRALIA**Mr Vijay Kumar
Chairman I.E.E. Internation Centre23 Ballidon Crescent
CARINE WA 6020Mr Mike Cullity
Wireless Historian119 Melvista Ave
NEDLANDS WA 6009Mr Ian Kelly
Director, Heritage Council WA25 Cross Street
SHENTON PARK 6008

Lt Commander Phil Chapman

HMAS Stirling
PO Box 22
ROCKINGHAM WA 6168Mr Glenn Darlington
ManagerABC Radio
191 Adelaide Terrace
EAST PERTH WA 6004Mr Lance Sanderson
Chief EngineerTelecom, Locked Bag 7
PERTH WA 6001Mr Bob Blonco
PresidentWA VHF Group
32 Beverley Place
CLOVERDALE WA 6105

Mr Don Graham

WA Digital Communications Association
42 Purdom Road
WEMBLEY WA 6014Mr Phil Maley
PresidentWireless Branch, Telecom
35 Second Avenue
ROSSMOYNE WA 6155Mr E Trigwell
Past Superintendent Wireless Branch TelecomWireless Branch, Telecom
125 Daglish Street
WEMBLEY WA 6014

Page 4.

Mr Herman Willemssen
Manager

Maritime Telstra
6 Whittington Ave
CARINE WA 6020

Mr Bill Creagh
Past State Manager

AWA Marine Aviation
PO Box 365
MOUNT HAWTHORN WA 6016

Mr Fred Illff

Spectrum Management Authority
PO Box 365
MOUNT HAWTHORN WA 6016

FRIENDS OF WIRELESS HILL PARK

Mr Fred & Mrs Ruth SHELLEY

2 Ferguson Street
ALFRED COVE 6154
330 4548

Mrs D BROOKING

27 Searle Rd
ARDROSS 6153
364 1692

Mr & Mrs SRHOY

8 Ferguson St
ALFRED COVE 6154
330 3590

Mr & Mrs H MCGRATH

41 Reynolds Rd
MT PLEASANT 6153
364 2339

Mr Jack Sullivan

4 Antony Street
PALMYRA WA 6157

Mr Joe Nevin

17 Shirley Avenue
MT PLEASANT WA 6153

GRAND TOTAL = 57

HISTORIC ENGINEERING MARKER CEREMONY

WIRELESS HILL PARK

MONDAY, OCTOBER 24/1994

PROGRAMME

- 5.20 PM** Her Worship the Mayor arrives to meet Guests.
- 5 40 PM** Chief Executive Officer to welcome guests and introduce special dignitaries.
- Chief Executive officer to introduce Mr Charles Waterton, WA Division President of the Institution of Engineers, Australia.
- 5.42 PM** Speech by Mr Charles Waterton
With introduction to Mr Bruce James. Chairman, WA Engineering Heritage Panel of the Institution of Engineers, Australia.
- 5.46 PM** Speech by Mr Bruce James - Explanation of the Historic Engineering Marker
With introduction to Hon Richard Lewis MLA Minister for Heritage and Member for Applecross.
- 5.50 PM** Speech by Hon Richard Lewis - History of the Perth Wireless Station.
- 6.00 PM** Chief Executive Officer to introduce Professor Doug Clyde. National President of the Institution of Engineers, Australia.
- 6.01 PM** Speech by Prof. Doug Clyde - Presentation of the Historic Engineering Marker Plaque.
- Prof. Doug Clyde to call Her Worship the Mayor to the unveiling plaque stand.
- Prof. Doug Clyde to unveil the plaque with Her Worship the Mayor.

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6.05 PM	Speech by Her Worship the Mayor June Barton acceptance of the plaque on behalf of the City
6.10 PM	<i>Mayor concludes the proceedings and invite guests to enjoy the City's hospitality and sign the visitors book.</i>

**HISTORIC ENGINEERING MARKER CEREMONY.
WIRELESS HILL PARK
MONDAY, OCTOBER 24/1994 AT 5.30 PM.**

APOLOGY LIST

POLITICIANS

Mr Jim McGinty MLA
Member for Fremantle

PO Box 871
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Mr Doug Shave MLA
Member for Melville

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Hon Clive Griffiths MLC
Member for South Metro Region

Suite 6, 890 Canning Hwy
APPLECROSS WA 6153
Ph: 364 4277
Fax: 364 3542

Hon Barbara Scott MLC
Member of the South Metro Region

29 Adelaide Street
FREMANTLE WA 6160
Ph: 430 7233
Fax: 430 7207

ELECTED MEMBERS

Cr Cameron Schuster & Ms Robin Goodchild

FREEMAN OF THE CITY:

Mr Jack HOWSON OBE & Mrs Pat HOWSON
CR. 1965-1973 MAYOR 1973-1989

31 Margaret St
COTTESLOE WA 6011
PH: 383 2991

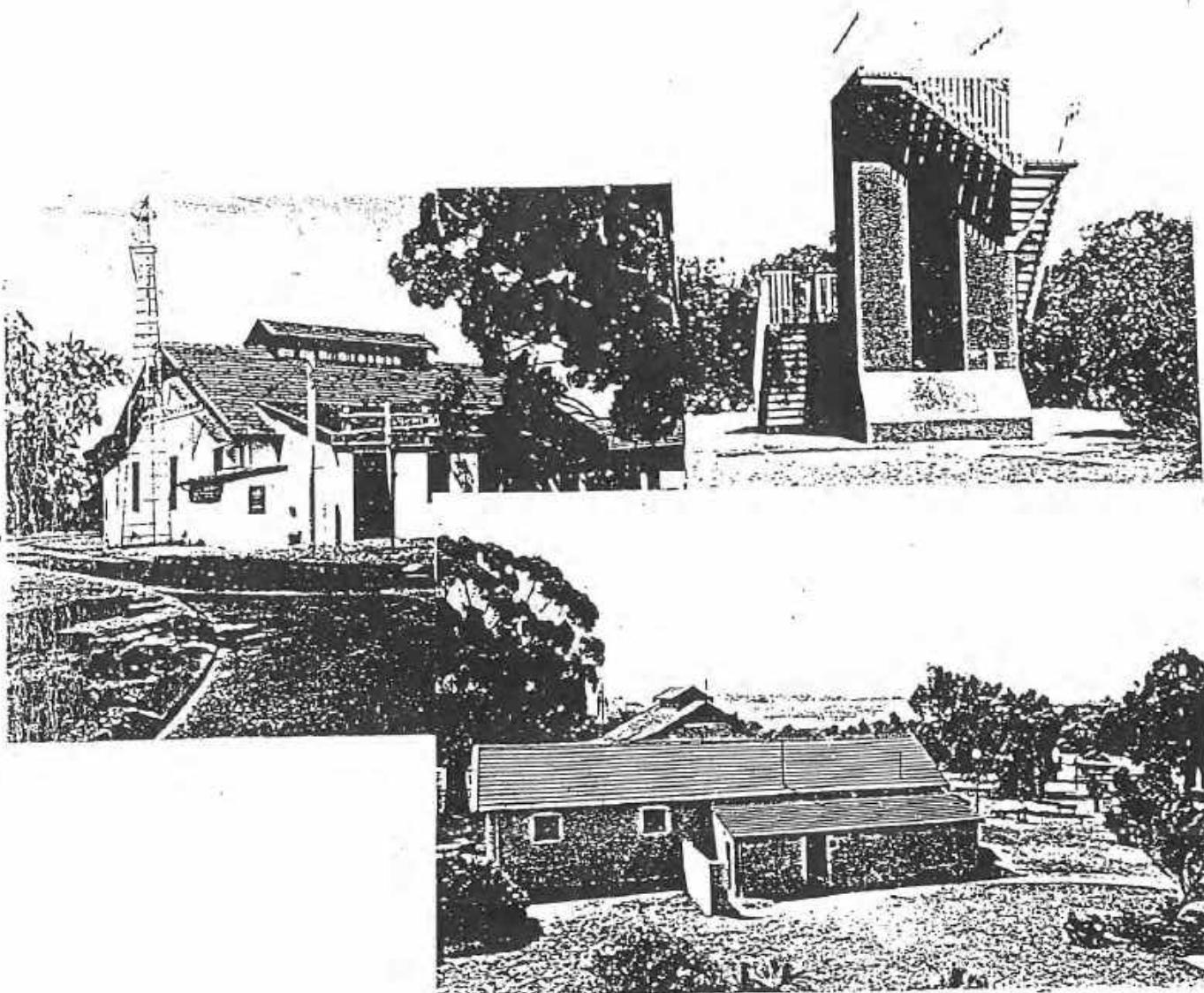
STAFF

Geoff Broad

Executive Manager Development Services

31 MAR 1994

A HISTORY OF WIRELESS HILL MELVILLE 1912 - 1967



Michael Cullity

PERTH WIRELESS STATION.
WIRELESS HILL, APPLECROSS.

Historical material researched as part of another
exercise and documented here for the record.

M.J.Cullity, B.E., M.B.A.
F.I.E.(Aust), F.I.E.E.

6/1/1993. Supercedes draft of 18/10/1992.

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.2	Material in Commonwealth Archives, Melbourne. Material in Commonwealth Archives Perth. Precis of files in Perth.	
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.4	Location and site Plans.	
.5	Plan drawings of the Engine House, Operators Building, Store, and Single Mens Quarters.	
.6	A study of the equipment shown on various photographic records and changes made over time.	
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.8	References to various pertinent technical articles in "ENGINEERING" relating to the early wireless systems.	
.9	Sequence of events with respect to wireless telegraphy taken from the West Australian, All the News in a Flash, A City for All Seasons, and Electronics Australia Anniversary issue. Does not cover the total period the station was in operation. Reproduced here for record purposes only.	

Preface.

My interest in the history of Wireless Hill began only very recently when I volunteered to have a look at Wireless Hill on behalf of the National Trust. On my first visit to the site I was not tremendously impressed with the buildings and wondered what it was all about. When I saw the whole site, the base for the 394 foot mast, the anchor blocks for the guys to the mast, the defined purposes for the buildings, the condition of the buildings, and I realised the state of the technology at the time of establishment of the station, I became aware of the importance of the history of the site and believed that the site was worth preserving.

As an engineer I was most interested in the changes which have taken place in the technology over the years. Perth Wireless Station commenced operations in 1912 just sixteen years after Marconi first demonstrated wireless telegraphy from the Post Office in London, sending messages over a distance of about twelve miles. I see the Perth Wireless Station as important in technological history as well as important in the place it took in communications with shipping on the West Coast of Australia over a long period of time, and later also as a feeder station and relay station for the beam system to Britain.

One of the problems was determining the history. There does not appear to have been any attempt to bring together all the available information. Only after I had done a lot of research was I referred to a Mrs. Linley Batterham who had pursued a trail similar to mine while researching a project for Murdoch University. She has intentions of pursuing it further and her paper will be a valuable contribution to the history of Wireless Hill by seeing the station from a different perspective to mine. I am very indebted to her for locating a 1960's plan of the aerials on the site having been previously advised by O.T.C. Archives that they did not hold any plans for the Applecross aerials.

This little effort does not profess to be a complete history in any way. It is an attempt to document what material I have obtained for the benefit of anybody interested in taking it further. There are still vast gaps in the information located by me, both from a technological as well as procedural and administrative points of view and this document suffers accordingly. A start has been made to trace the changes in equipment and to explain the purpose of the equipment. In the absence of the original documentation, some recourse has had to be made to what is hoped to be intelligent deductions. Changes have been made to the document as new material has become available however the state of knowledge is still so fluid that many more changes could well be required. The draft has been revised and revised in an attempt to remove obvious errors however no doubt some survive. If there is sufficient input it is quite

possible that this document could be updated some time in the future.

The establishment of the Wireless Station at Applecross and the control of the station over the years has been the result of factors not directly associated with Applecross. In order to understand the changes at Applecross it is important to have a broader view of the overall situation. Some of these factors have been extracted and form the Forward to this document.

My research has been limited to what material is available in Western Australia and possibly skirts around the main material which hopefully still resides in the Eastern States, and consequently I have had to rely on published accounts, verbal stories and photographs. I believe it to be imperative that actions be taken to determine what further records exist. The collection of the history will get more difficult with time and whatever is available now should be gathered together and preserved in a suitable place.

In the absence of comprehensive written documentation, recourse has also had to be made to what photographic evidence is available. As with the written material, there is not one set of comprehensive photographs and the further one delves, more and more photographs seem to turn up. Further, with respect to the photographs, in a lot of cases the material in the photos is unknown leaving much to the imagination. Even the dates some of the photographs were taken are unknown. I have attempted to analyse those photographs which have been available to me and which I am in a position to contribute, and have included that analysis as an appendix to this document. What I am trying to say is that photographic evidence is most important. I would like to see a determined attempt made at this stage to gather together whatever material is available from whatever source and to catalogue and research it, and to store or display it as seen fit. A duplicate copy should be preserved in the state archives in the event of the working copy being destroyed or lost.

This document is not meant to be comprehensive and various incidents which have been brought to notice have not been included as they don't really impinge on the message which I have wanted to convey. I have not traced the staffing of the station, the shifts worked, the managers. Doug Rickman told me about the circus elephant which escaped from near the Causeway and was found in the grounds of the station. This should appear somewhere in the West Australian newspaper. The relevant parts of the memoirs of Joseph Murray Johnston, the electrical mechanic who installed the first equipment in 1912 have not been included. Some one climbed the mast at another stage and was caught and prosecuted. In the 1940's a young engineering student who will not be named climbed the mast one night as part of a University prank and was not caught. While writing this I recalled seeing where a Mrs. Clifford donated a typewriter to O.T.C. I happened to go to school with Julian Clifford and thought I should inquire

about the typewriter, perhaps it was the one in the photograph of 1931. Julian's father "Nat Clifford" was a wireless operator on the Sydney during the first world war and shortly after that war was employed by A.W.A., being transferred to Applecross in 1933. During the second world war, all the news came in by morse code. The typewriter typed only in upper case type and produced three copies on a continuous roll of paper for delivery to the newspapers each morning. Minimal records were kept at the wireless station. Sometimes the static was pretty bad and the operators used their individual discretion where some of the statistics were missed. During the war years, about 1941 -1942, Julian was a messenger boy and delivered the copies of the news to the A.B.C., the Daily News, and the West Australian on his way to school. He had to catch the first Metro bus from Perth in the mornings, get off at the wirelss station, race up the hill, and then return by bus to Perth. At that stage the Canning Bridge was a one lane bridge and risk of accidents was ever present. For that task he was paid the princely sum of 50 or 60 pence per week. It would be good if these stories could be recorded before they are lost forever.

When one thought that one had all the information that was available, a letter was received from A.W.A. the operators of the Wireless Station from 1922 to 1946 acknowledging my request to them for information and offering to try and research some of A.W.A's. early documents that are still available. At this time nothing has been received. Later still John Moynihan extracted a list of material that is held in the Commonwealth Archives Perth relating to the initial period while under the control of the P.M.G's Department. This document has been amended to include anything of value from that source. The Commonwealth Archives were one of the first bodies approached by me and were not able at that time to locate any material held in Western Australia. While following up the above at the Commonwealth Archives I met a Muriel Utting who apparently is the official historian to the Perth Observatory and she is writing a book on the history of the Observatory. When told that I was researching the Perth Wireless Station she offered some information relating to interactions between the Observatory and the Navy during the first World War which she said was most interesting. I have not availed myself of that offer, I dont want to be in advance of her book, but at some stage it should be retrieved, perhaps when her book is published.

I have troubled many people in searching out the limited information recorded herein. They have all been most helpful and co-operative and they are acknowledged in the references. If they are not, I apologize.

MICHAEL CULLITY.

FORWARD

The forward attempts to point to various factors which contributed to delays in the first instance in the setting up of coastal wireless stations in Australia, and further delays in the early 1920's in wireless contact with Britain, both of which impinged in some way on the future of Applecross while not being directly connected thereto.

PART 1. The Setting up of a Wireless Chain Within Australia.

Australia was rather slow in the adoption of wireless for communication purposes despite the decided advantages it could give for a country of our size. This was not for want of endeavour by the commercial companies. When Australia's first Prime Minister was asked about a wireless service between Tasmania and the mainland, he replied that the Marconi system had not been applied commercially to such long distances.

In October 1902 the Marconi Company submitted a proposal to the Commonwealth Government to connect Australia and New Zealand by wireless, but nothing came of the plan.

In 1903 the Company offered to bridge Bass Strait for 5,000 pounds but again nothing came of the proposal.

In 1903 Lloyd's of London had thoughts about wireless on Rottnest.

In 1904 the Commander of the Australian Naval Station urged the establishment of coastal stations at strategic points.

In 1905 the Commonwealth Government passed the Wireless Telegraphy Act. The act gave the Post Master General the exclusive right to transmit and receive messages in Australia, and between Australia and other countries or ships at sea. It also provided for the P.M.G. to issue licences on prescribed terms. Harsh penalties were included for the unauthorized use of wireless apparatus. (E.A.)

In 1906 the Marconi Company obtained a licence to conduct tests across Bass Strait. On the 12th July the Company arranged a public demonstration in a grand manner. Among the guests were the Governor General, the Victorian Governor, the Prime Minister and most of his ministry, Victorian politicians, business guests and press. Despite the success of the demonstrations and the hopes and goodwill expressed, the Government continued to wait and see.

In 1906 Lloyds wrote to the Fremantle Harbour Trust "thought there may be some advantages of wireless telegraphy on Rottnest." The Harbour Trust corresponded with the Post Master General's office in Melbourne and were advised "The Minister will communicate with Lloyds if he decides to take up the offer".

In 1909 the Harbour Trust approached the Colonial Secretary's office regarding wireless and were told to the effect that the Commonwealth should undertake the work. The foregoing is only indicative of the situation at the time.

The Australian attitude would have been markedly influenced by the thinking in Britain and by Australia's participation

in the various Imperial communications conferences. One major concern seemed to be the fear that the Marconi Company could with the patent rights it held, become a monopoly and like an octopus control wireless communications world wide.

In England other forces were at work apart from wireless. First one has to recognise the political processes at play. The Government had not competed with telegraphs inside the UK, it had bought them up entirely. The cables to the continent of Europe had been purchased by the Submarine Cable Company. The Imperial government had never given a subsidy to procure the laying of a competitive cable or bring about a reduction in rates; merely given them subsidies to procure communication where communication did not exist. There was a belief that there was no place for Government in competing with the private sector. The granting too, of rights to firms to communicate with other countries by telegraphy using undersea cables was tightly controlled.

In the 1880's and 1890's, the Eastern Telegraph Company was the major company providing telegraph services within the Empire. The companies were private companies who had to have regard for return to their shareholders as well as providing a service to the community. Because of the rights afforded them the various cable companies held virtual monopolies for the parts of the world serviced by them and this led to claims of excessive charges for their services. Thus in 1892 Cecil Rhodes was proposing to run an overland telegraph line up Africa to Cairo and then to join with a cable to Europe, thereby bypassing Eastern's cable and reducing the cable charge to South Africa from 9/0 per word to 2/6 per word. Australia was dissatisfied too in that it did not have cheap and speedy communications with the mother country. The rate of 10/8 per word was prohibitive, and the odds that all sections of the circuitous route via Java, Singapore, across India, up the Red Sea, through the Mediterranean and the Bay of Biscay to Porthcurno, would all be working at the time you sent your message were very small.

At a conference in Sydney in 1877 the Australian and New Zealand Governments made the first move in a campaign to challenge the assumption that governments, would not and could not, undertake the laying or operation of submarine cables when they investigated the practicability of a Pacific cable. In 1879 Sandford Fleming the chief engineer of the Canadian Pacific Railway, with the determination of the terminus of the east to west overland telegraph wrote, "If these connections are made, we shall have a complete overland telegraph from the Atlantic to the Pacific Coast. It appears to me to follow that, as a question of Imperial importance, the British possessions to the west of the Pacific Ocean should be connected by submarine cable with the Canadian line. Great Britain will thus be brought into direct communication with all the greater colonies and dependencies without passing through foreign countries. 5/6/1896 to 12/11/1896. Joseph Chamberlain. Imperial Pacific Cable Committee. In response to a request as to whether the

Eastern Telegraph Co. was willing to work and maintain the line for an agreed annual sum, Lord Tweeddale responded. "Not a line from Vancouver to Fanning Island. The risks are so great the Company could not undertake that on any terms. John Lamb of the British Post Office claimed the Government could establish the system and manage it more cheaply than a private Company. The committee thought it would be interfering with private enterprise and would be stepping on a slide which would carry it into difficulties.

5/1/1897. Report of committee. Technically possible. Survey of route to be made. Recommend State ownership.

1897. Conference of Premiers of self governing Colonies. Discussed. Colonies to take the initiative. At this stage the states of Australia were all self governing colonies and there was not unison between the states. The Pacific Cable was left in limbo. Sandford Fleming, Chief Engineer of the Canadian Pacific Railways thought Canada should take the initiative.

And so the debate went on. Suffice to recognise that there was a questioning of the importance of communications and whether it should be the responsibility of governments or private interests. In 1901 the Pacific Cable scheme was put into effect under government ownership. When the matter came before the British Parliament, John Henniker Heaton said "I know no monopoly in the world that is doing more injury to trade than the concentrated companies represented by the Eastern Telegraph Company and its six or seven satellites... etc".

This dominance of the external communications in Britain by the cable companies and their pricing policies and the public perception thereof prejudiced official thinking to the detriment of the early commercialization of wireless.

Turning now to wireless. The British Post Office held the telegraph and telephone monopoly as a state service. The Post Office was interested in availing itself of Marconi's patents and in 1896 William Preece recommended the Government purchase them for 10,000 pounds. Nothing was done. In 1897 Marconi was granted a licence to provide a limited system to allow the East Goodwin lightship to contact the South Foreland lighthouse and the stations which Marconi had developed on the coast as part of his ship to shore operation. Any messages received at these stations had to be handed over to the Post Office for delivery.

In 1899 the Post Office wanted to acquire the rights to use wireless, and in response Marconi offered them the right to use it within the UK for 30,000 pounds, and as an extension from the UK to British Possessions overseas for 50,000 pounds. Treasury regarded this excessive and the negotiations were broken off.

In 1899 Preece pointed out to the Government that Marconi had no commercial circuit at work anywhere. There was no case for granting his company a general licence to make money. This attitude seems rather incredible. If the system did not work, he would not make money. If he was not allowed to set up a system he could not prove that it would work. The Post Office had the power to grant a licence yet wanted the trade for themselves.

The cable companies derived comfort from the fact that while the Government was sitting on the fence, which looked like being for a long time, they refused to grant Marconi the commercial facilities to enable him to prove himself. Marconi in his historic spanning of the Atlantic in 1901 set up his receiving station in Newfoundland and acknowledged receipt of the signal back via the cable telegraph. In 1902 the Anglo American Company instructed their solicitors to write him a letter pointing out that Anglo American had a monopoly of the communications throughout Newfoundland, and forbidding him to make any further infringement of their rights under pain of legal action.

In 1902, Marconi applied to the Government for an exclusive licence to practise wireless telegraphy between England and ships at sea, between England and foreign countries, and between England and the British colonies. His shipping operations were allowed because he so arranged his operations that he rented out his apparatus and operators and did not charge for the messages transmitted.

On the 31/12/1902 Neville Chamberlain, disabused Marconi of any such idea and told him categorically it was not in his power to give him the licence to which he now applied again. In 1902/1903 Cuthbert Hall, Marconi Managing Director in a minute to Marconi said;- They see that wireless is fraught with all sorts of possibilities and that finality has not nearly been reached. They wish, therefore, to remain in a position to take the whole thing over without paying compensation to us when they can work it satisfactorily themselves, or to shut the whole thing up if it suits their convenience for naval purposes or because of the cable interests.

In 1903 Marconi claimed he could send messages across the Atlantic for 1 cent a word, however his directors said 10 cents which compared favourably with the 25 cents per word charged for a cablegram.

On the first of January 1905 the Wireless Telegraphy Act became law. Marconi's company was given licences for all its ship to shore stations for 8 years, it looked as if he was going to be allowed to develop as a private telegraph operator in Britain after all. But then in 1909 the Post Office offered to buy his stations for cash. Since the Post Office seemed unlikely to renew the licences when they expired in 1913, the company accepted. The nine stations were transferred to the Post Office in September 1909.

In 1910 Marconi presented the Colonial Office with a plan for linking the entire British empire with a network of 18 wireless stations and asked for licences from the Post Office for the home terminals and help from H.M.G. in securing licences from the self governing colonies.

In March 1911 the Cable Landing Rights Committee rejected the plan, and suggested the Government take it over. It recommended a state owned Imperial wireless system which the Marconi company would be invited to build (Liberal Government).

In June 1911 an Imperial Conference in London reported "that the great importance of wireless telegraphy for social, commercial and defensive purposes renders it desirable that the scheme of wireless telegraphy approved at the conference

held at Melbourne in December 1909 be extended throughout the Empire with the ultimate object of establishing a chain of British, state owned wireless stations which in emergency would enable the Empire to be to a great extent independent of submarine cables."

By March 1912 a draft contract had been arrived at between Marconi and the committee set up for the purpose. The Post Master General had not announced it in Parliament but the Marconi Company announced the terms of the tender, a step which many, particularly the Tory opposition thought ill advised. The Company was to build the first 6 stations at 60,000 pounds each, and receive a royalty of 10 per cent of the gross takings at each station for 28 years. The respective Post and Telegraph Departments would own and operate the stations in the distant countries. The Tory opposition thought the terms over generous. Why were tenders not called? Was it because certain Government Ministers had shares in the Marconi Company, etc.? Between August 1911 and April 1912 the shares had risen from 2-10-0 to 9-0-0 a share. A select committee set up on the 25th Oct. for the purpose of investigating any impropriety on the part of the Government repudiated the charges that the ministers had been influenced in their public duty. This was referred to as the Marconi scandal.

Another select committee under Lord Parker was appointed to report on the Marconi system in comparison with others. The creation of the chain was urgent. Marconi was the only company to have worked over 2,000 miles regularly.

On the 8th of August 1913 the Contract was ratified with the basic clauses unaltered. Marconi, whose staff had been standing by all these months, were then given the contract. The democratic process had taken two and a half years.

With the outbreak of the Great War on the 4th August 1914 very little had been done on the contract, sites had been selected in Egypt, India, and England, and a few aerial masts had been erected. The contract was cancelled. The Marconi scandal had deprived Britain of a potentially powerful device for helping to defeat the Germans. Marconi sued the Post Office for 600,000 pounds damages - and got them.

Returning now to Australia.

In 1909 an Imperial Press conference in London advocated an imperial system of wireless telegraphy be established including a station about Perth.(M).

In 1909 an inter - Imperial Conference was held in Melbourne Dec. at which the future provision of wireless communications in Australia and the Pacific islands was discussed. Australia undertook to build two land stations, one in Sydney and the other near Fremantle etc.(E.A.).

In 1910 Five tenders were received. Marconi's tender was for 19,020 pounds, and Australasian Wireless Limited 4,150 pounds for each station.

With the threat of war the Commonwealth hastily proceeded to establish a chain of a further 17 stations around Australia. The Commonwealth appointed a Mr. Bassillie, a wireless engineer with overseas experience in designing and operating wireless stations, as their expert, and proceeded with the erection of the stations to Bassillie's design and manufactured by Father Shaw in Melbourne. They were subsequently party to a patent infringement action by the Marconi Company, along with the other parties involved.

The Australian position seems to be amply covered by an answer in Parliament by the Prime Minister. (West Australian 2/5/1912. W.A.) "No," said the Prime Minister (Mr. Fisher) in reply to a question today. "the reported acceptance by the Imperial Post Master General of the terms of the Marconi Company for the construction of long distance wireless stations does not in any way bind Australia.

It was added that the British Minister was acting on behalf of the British Government and the Governments of the dominions. etc. etc. The resolution passed at the Imperial Conference was merely affirming the desirability of a state-owned wireless system being established within the Empire. Certainly the Commonwealth was not going to pay 60,000 pounds for any wireless station, at the present time at any rate.

"We have our own system, and we are going ahead with it." Mr. Fisher said in emphatic tones. "We must have wireless facilities, and we do not intend to wait three or four years for big power stations while smaller ones for shipping and other purposes are such an urgent necessity. If we are indebted to anybody for any features of the system we have adopted, we will gladly pay a fair thing, but we are going right on."

FORWARD PART. 2. The Establishment of a Direct Wireless Link with Britain.

The above gives a brief introduction to the politics which preceded the setting up of a coastal wireless telegraph chain around Australia, and a linkage between Perth and Sydney which would be invaluable if Australia were cut in two by war. Further protracted negotiations were involved in setting up of an Imperial wireless communications system in the early 1920's.

The transfer of control of the Perth Wireless Station from the Post Master General's Department to Amalgamated Wireless Australasia in 1922 was the result of much wider considerations than purely the local issue of Applecross. Because these considerations resulted in a change in ownership of the Applecross station for the next 40 years, they do impinge on the history of the Applecross station even though the issues were not immediately relevant to Applecross and what difference the change in ownership made is impossible to conceive. Following are precis of a

sequence of articles appearing in the West Australian of the period which put the picture adequately. Britain had been proposing a chain of radio relay stations throughout the empire. At the Imperial Conference, Hughes informed Britain he was not prepared to settle for less than a direct radio link with Britain. At one stage there seemed to be a number of schemes on the go at once. While the Australian Government seemed to be determined on a direct link with Britain, they were at the same time appearing to go along with the chain of relay stations recommended by the Norman committee.

Following are precis of a series of reports appearing in the West Australian at the time and which are largely self explanatory. Comments have been included in brackets where considered necessary.

5/2/1921 (W.A. 7.8) Elucidation of the Imperial Wireless Chain. (British Norman relay chain). Links of 4,000 miles would require arc transmission. A British Post Office service between England and Egypt would shortly be in service. No link in the Empire chain would be greater than 2,000 miles. The proposal is to use thermionic valves in the transmitters which is in line of future developments and would cost less than using arc transmitters. Wireless stations would be located in England, near Cairo, Singapore, Hong Kong, and on the north coast of the West of Australia.

15/2/1921 (W.A. 6.7) Statement by the Post Master General re the Imperial Wireless scheme. Preliminary action was being taken for the selection of a site in Western Australia. (Here it seems the Australian Post Master General is going along with the Norman proposals).

Oct. 17th. 1921 6.5n Question in Parliament of the cost of the wireless station now in progress of erection. Capital expenditure of 500,000 pounds. (Norman scheme).

Nov 21. 1921 8.6 Further details available re high power radio station to be built between Sydney and Melbourne. Originally it was to be in built in W.A. but shifted because it could be cut off by war and because 90% of the traffic would be with the Eastern States. An identical station to be built in England. The British station to go ahead immediately the Australian Parliament approve the 2,000 mile service radius in accordance with the Norman plan.

(Obviously the Australian government is keeping its options open).

Dec. 1. 1921 9.5 The Radio Communication Company said it could establish a high power station in Australia and bring the feeder stations up to scratch for much less than the 500,000 pounds proposed by A.W.A. They will also establish at their own cost a matching station in the U.K. Cost of the operation will be 20% less than that of A.W.A. (The Australian Government's proposal for a high power direct link was a result of the initiative of A.W.A. and Marconi. The Radio Communication Company is merely trying to move in on the act).

Dec. 2. 7.7 1921 A.W.A.'s. proposals for two high powered stations in Victoria or New South Wales and feeder stations.

Dec.6. 1921 6.6 First direct wireless press message from Marconi station at Caernarvon to A.W.A. experimental station in Victoria. 7 p.m.

Dec 7. 1921 7.8 Alternative proposals for setting up a high power station by the Radio Communication Company. A company to be set up with an issued capital of 700,000 pounds. The Commonwealth to own 50% plus 1 share. Three directors to be nominated by the Commonwealth government and three to be nominated by the company.

Jan.25. 1922 7.5 Wireless Telegraphy. The Committee Meets. A committee of Federal Parliament to examine three proposals. A.W.A.'s. direct link with the U.K., the Norman scheme of relays, and a proposal from the Radio Communication Company.

Jan.24. 7.7 1922 Mr Stewart of the Radio Company and Mr Fisk of A.W.A. gave evidence to the above committee in confidence.

Feb.3. 7.7 1922 Enquiry half complete.

Mar.14. 8.7 1922 Wireless committee met in private when further evidence given. Report will be made public after consideration by cabinet.

Mar.16. 6.8 1922 Committee negotiating with A.W.A.

Mar.18. 8.1 1922 Committee completes report to go to cabinet.

Mar.25. 9.4 1922 Cabinet approved the wireless telegraphy agreement with A.W.A. The interests of the Government with regard to the Company are protected.

Mar.30. 1922 7.6 A.W.A. said at least two years would elapse before the service commenced. A.W.A. were empowered to negotiate for stations in England and Canada within a period of six months. Each station would be three times as powerful as any European station today. Cost of contract 1,000,000 pounds. A.W.A. to take over all existing Australian stations as feeder stations and will re equip.

Mar.31. 1922 6.8 Report not unanimous. The Labour party representatives wanted a full Government controlled station. Mr. Brennan did not sign the report.

April.1. 1922 9.5 Mr. Bruce said all members of the committee were in agreement.

April.3. 1922 6.8 Mr. Bruce. No expenditure on the part of the Commonwealth. The Commonwealth can prohibit the erection of any station where it could compete with the Government's telegraph lines.

April.5. 1922 6.6 The Radio communication Company who were not recommended alleged extravagance in the agreement. Each station was proposed to have 24 towers each 800 feet high. One can easily see how proposals are to cost 1,000,000 pounds. In comparison the British Wireless Company at Bordeaux have 8 towers each 800 feet high.

May.18. 1922 7.7 Interview with Mr.Fisk by the West Australian while in Fremantle on way to England by the Sophocles. Directors have been appointed to a joint company which will set up communications as per the agreement.

June.22. 1922 7.3 New York. Signor Marconi lectured to a group of engineers to the effect that he had devised a new way of sending radio waves using reflectors which makes the loudness of the signals 200 times. Shows the relative facility with which radio signals could now be sent from England to Australia. (Marconi was lecturing on the use of

reflectors with short wave length wireless transmissions. The ultimate adoption of short wave transmissions resulted in smaller aeriels, smaller transmitters, more reliable reception, and an economic detriment to the Marconi Company due to the reduction in the cost of the system).

July.13. 1922 7.4 Publication of evidence.

Mr.Fisk. Marconi Company had developed devices to effectively eliminate atmospheric interference.

Imperial Wireless Telegraph Committee stated a commercial service over the distance proposed was impractical. Information on trans Pacific service. Little paid traffic was handled. Speed adversely affected by interference. Average traffic handled 20 words per minute. (Even in 1922 the Imperial committee considered a direct link impractical. The pan Pacific service was the wireless system set up by Marconi across the Pacific).

7/3/1923 (W.A. 9.4) Empire Wireless Chain. The British Government considered there should be a government wireless station in Great Britain capable of communicating with the dominions. It would also be available for commercial communications. It was unnecessary to exclude private enterprise from participation and licenses would be granted subject to conditions ensuring Government control.

7/3/1923 (W.A. 9.4) Mr Bruce could not comment further on the above as he had had no official communication.

1/9/1923 (W.A. 11.8) At the A.W.A. annual General Meeting it was announced that the A.W.A. tender for 487,000 pounds had been accepted for a high power station and the company would erect stations in Australia, England and Canada.

25/9/1923 (W.A. 6.8) Wireless Agreement. A reported hitch. In the opinion of Mr Fisk the Managing Director of A.W.A. every proposal or scheme to reduce the cost of communications between England and Australia and other parts of the empire has been vigorously opposed by the British Post Office.

21/12/1923 (W.A. 11.8) Wireless Telegraph Agreement imperils Australia. Due to the decision of the Imperial Government not to issue a license to Marconi to erect a wireless station in Great Britain the agreement entered into two years ago between the Commonwealth Government and A.W.A. for direct communications between England and Australia is imperilled. Marconi was the successful tenderer to A.W.A. for the station in Britain. Marconi was also the successful tenderer for Australia at 487,000 pounds. It was now impossible to provide the main trunk station by April next. Mr Bruce had emphasised the urgency of the matter due to the inadequate cable service. The station was to be the most powerful in the world and would incorporate all the recent developments in wireless communications. The station would differ from practically all the high power wireless stations in the world in that thermionic valves would be used to generate the high frequency currents for energizing the aerial. Each of the twenty 800 feet high latticed towers was expected to be an engineering achievement.

The British Government apparently desired to control the flow of messages from Great Britain.

2/5/1924 (W.A. 7.5) A conference between A.W.A., the Commonwealth government and Mr.Bruce was held on the subject

of the Empire Wireless but because the subject was extremely complicated, there were no tangible results. Mr Bruce had not accepted the British governments decision to accept the Donald report recommending that all communications in Great Britain be by the British Post Office. The contract between the Commonwealth government and A.W.A. was now incapable of being carried out. Under the contract the revenue from all traffic both ways was to be shared 50/50 with Marconi. With the British Post Office involved, all revenues at the British end, which would be the major part, would go to the Post Office. This would make the scheme non viable.

7/5/1924 (W.A. 9.2) London press report. Condemning the British governments fetish for government control. The Empire Wireless chain is a matter for cordial co operation between the Mother country and the Dominions, and that line of approach to the problem has not been tried yet.

9/5/1924 (W.A. 7.7) Statement by Mr Bruce. Some developments are expected. A further cable has been received from the British government but he regretted he was not at liberty to disclose its contents.

23/5/1924 (W.A. 9.8) Successful experiment between Marconi in the U.K. and A.W.A. in Sydney. Proof beyond all doubt that wireless communications possible using the Beam System. A revolution in wireless communications and will considerably reduce the cost of erecting stations. The original contract price of 487,000 pounds will reduce to less than 100,000 pounds using the beam system and there will be no maintenance. The system employs short waves and the use of reflectors. There are technical advantages in the reduction of energy needed and a reduction of interference with other stations. The development of the Beam System strengthens the Australian opposition to the monopoly by the British Post Office in the United Kingdom.

1924 Tests between Marconi in Britain and A.W.A. in Australia at wavelengths from 90 metres down. Successful using telegraphy and telephony. Transmitters using thermionic valves.(E.A.).

23/5/1924 (W.A. 9.8) Imperial Wireless Chain. Statement by Minister (Britain). He was still unable to state the policy of the government. There would be no avoidable delay.

4/6/1924 (W.A. 9.1) Mr E.T.Fisk reported successful radio telephony between Senatore Marconi's experimental station at Poldhu and Mr Fisk's experimental station at his home in Vaucluse.

22/10/1924 (W.A. 9.8) Wireless Scheme. Beam System for Australia. A.W.A. is to select a site in Australia. Until the British Government is advised that work has commenced in Australia the erection of a reciprocal station in England will not be entered into. Expected erection time in Australia to be 8 months. The agreement between Marconi and the British government includes the following clauses - the station has to operate an average of 18 hours per day, the station has to handle 100 five letter words per minute each way exclusive of repeats for accuracy over a seven day test. If the station does not meet the tests or if the Company fails to establish a corresponding station in Canada the British Post Master General free to reject the English station.

22/10/1924 (W.A. 9.3) A.W.A. loss in trading. Owing to the British government changing policy the Company could not proceed with the establishment of its main trunk line stations for wireless communications with England and Canada, but in the end the delay proved beneficial because in the meanwhile Marconi had brought the beam system to a commercial stage. As a result the directors believed they will be able to establish a commercial service to England and Canada which will combine greater carrying capacity with less cost.

23/5/1925 (W.A. 14.2) In reply to adverse comments re the delays in the construction of the wireless stations, Mr Fisk announced the contract had been signed last December. Negotiations for the acquisition of sites had been complete in 10 weeks. Men were currently at work on forming the sites. Much of the specialized Marconi equipment was on the way from England. He expected the construction work to be complete by January. Arrangements had been made for handling a large volume of traffic when the service started. Operators and assistants were being trained. A similar station was in the course of erection at Montreal and there was every indication that Australia and Canada would be ready for full load traffic early in 1926. Modifications to the Pennant Hills station were in hand and a feeder station to handle New South Wales overseas traffic would be erected there. The company had recently purchased a building in Melbourne and high speed telegraphic equipment would be installed there and from which operators would work on the Beam system direct to London, Montreal, Sydney, and the other capitals of Australia. Similarly in the heart of Sydney, offices would be equipped to deal with the Commonwealth and other wireless traffic. The service was to be opened with the rates for all classes of traffic including Plain language, Code, Government, and Press, much lower than those in operation at present.

2/6/1925 (W.A. 7.4) The Prime Minister Mr Bruce said the Australian station would be complete at the same time as the English station early in the new year. In response to objections from people remote from communications, the government was willing to license stations in the country but there was the problem with telegraphs. The problem of competition had to be thought out.

19/6/1925 (W.A. 10.5) Report by the Auditor General referring to the agreement made by the Commonwealth Government and A.W.A. on March 22, 1922. No act of Parliament appears to have been made to ratify the agreement. 637,500 pounds have been provided to pay for the shares. That is a 137,500 over provision. Costs to the Commonwealth were 112,500 pounds. A dividend of 6% was paid in September 1922. No dividends have been received since.

25/7/1925 (W.A. 13.3) The Marconi Company reports that during the last fortnight experimental transmissions had been received successfully during the whole of the 24 hours in Canada and Australia. The reception in India and South Africa had been so successful that there was no doubt that the Company could meet its commitments.

19/8/1925 (W.A. 11.5) Wireless Telegraph. The British Post Master General announced that the transmitting station at

Grimsby and the receiving station at Skegness for communication with Australia would not be completed until May 8th, 1926. This will be four months after the completion of the reciprocal Australian station under contract between A.W.A. and the Marconi Co. Ltd. One strange feature is that the Commonwealth government has received no official advice from the British Government on the matter.

30/10/1930 (W.A. 13.6) The chairman of A.W.A., Mr. Fisk announced at the Annual General Meeting - In these days of difficult Government finance we are glad to pay a good dividend to the Government shares. The government has received a dividend of 56,000 pounds and terminal taxes of 70,000 pounds. The Radio Telephone service to England has not been placed on a paying basis but the directors are confident the company would be compensated for its pioneering work. The Beam Service and the company had been approached re a similar service to Japan and other countries. Pending the completion of the arrangements for the taking over of the cable services to Australia, extensions of this kind had been postponed.

PERTH WIRELESS STATION AND WIRELESS HILL PARK.
1911 - 1992.

The Perth Wireless Station was one of the first official wireless stations in Australia and was completed in 1912. Sydney and Perth were the first to gain approval for construction however due to various delays they were not the first to be completed. The station in Melbourne was completed in February 1912 more than six months before the Sydney and Perth stations were completed. Even though the Perth Station was not complete it had exchanged messages with Melbourne in March of 1912.

Looking at this from a 1990's perspective, this was not long after the first demonstration of wireless and was in a period of rapid technological and commercial development of wireless telegraphy. There is a considerable amount of literature on the subject and the following remarks are indicative only of the time scale of development and in no way attempt to cover the field.

Marconi took out a patent and made the first practical demonstration of wireless telegraphy on a limited scale from the roof of the G.P.O in London in 1896. In 1897 he erected a land station in Italy and communicated successfully with Italian battleships. In 1901 he successfully communicated from Cornwall to Newfoundland. The technology was in its infancy and to achieve reliable communication over this distance the use was made of large antennae, lots of radiated power, and the signals were tuned to a low frequency long wave length radiation. According to R.N.Vyvyan, Marconi did demonstrate to William Preece of the Post Office in 1896 that short waves could be directed in a beam, using a paraboloid reflector, but no further research was carried out on this until 1916. It did not seem to be a promising field, states Vyvyan, as it was known that the attenuation of short waves was very high and the power that could be used with short waves in 1896 was small. Nothing was known either in 1896 of the effect of the Heavyside Layer in the upper atmosphere, nor of its ability to reflect waves. Thus research on short wave propagation was neglected.

A major use of wireless in the initial period was for ship to ship, and ship to shore communications bringing benefits of safety at sea as well allowing commercial contact with shipping. With a sufficient number of coastal installations as well as ship to ship communication, the distance needed to be covered by the wireless signals for a practical communication system was limited and possible with the technology of the time.

In 1903 and again in 1906, Lloyd's of London thought there may be advantages in the installation of Wireless on Rottnest. In 1906 the Fremantle Harbour Trust corresponded with the P.M.G. in Melbourne and were told "the Minister will correspond with Lloyds if he decides to take up the offer".

In 1909 the Australian Government undertook to build two land stations, one in Sydney and the other near Fremantle to command the seaward approaches on either side of the continent and for communications within Australia. In April 1910 the Government announced its acceptance of the tender by the Australasian Wireless Co., of Sydney, an associate of the Telefunken Company of Germany, of its tender of 4,150 pounds for each station.

Subsequently, spurred on by the threat of war, the government proceeded with the establishment of a further 16 stations designed and constructed in Australia thereby leaving itself open to the threat of legal action. The Marconi Company was actively engaged in preserving its patent rights and it was common practice at that time to include a clause in the contract protecting the purchaser in the event of patent infringements. The West Australian of the 13th July 1911 carried an article with reference to the recent Parker judgement re infringement of the Marconi patents. Deputy Prime Minister Mr. Hughes referred to the effect of the recent judgement on the Commonwealth stations. The positions with respect to Fremantle and Sydney stations was clear. The Australasian Wireless Co. system which was working under the Telefunken system, guaranteed the Commonwealth against loss or action, and in addition the contractors had to give an efficient working plant. Port Moresby and Thursday Island plants had been postponed as the Commonwealth could not go on if it knew it was infringing the Marconi patents. The possibility of further action was imminent.

The West Australian of the 5th December 1911 carried the following report. "Telefunken has advised the Australasian Company that the action by the Marconi Company against Siemens had been withdrawn. The Post Master General, Mr Fraser, did not know what effect this would have on difficulties which appeared to have been raised by British courts with respect to the other Australian stations. As soon as the matter was cleared up the Commonwealth would go ahead setting up its own 500 mile stations around Australia".

The opening of the Melbourne station by the Governor General was carried in the West Australian Newspaper on the 10th February 1912. The system used was kept a profound secret. The Post Master General said that his Government recognized that Australia was behind the times in wireless and intended to push ahead. They had been beset by difficulties. If it was subsequently discovered that they had been infringing patents they were prepared to pay a reasonable sum.

Returning to Applecross. Tenders were called for the wireless equipment for Pennant Hills and Fremantle on the 21st October 1909 closing on the 22nd February 1910. This date was subsequently extended to the first of March when an extra clause was included in the specification giving preference to a system providing a distinct musical note. The tender was accepted as above on the 4th April 1910. They then had a tenderer and known equipment but not a site.

On the 12th August 1910 the Chief Electrical Engineer of the P.M.G. sent a memo to the Electrical Engineer in Perth setting out the criteria for the selection of a site.

1. Determining factor. Suitability for defence.
2. P.M.G's. Dept. concerned on the effect of selection rather than in controlling the selection.
3. If P.M.G's. objection to the site should be clearly made known to Captain Cresswell at the time and reported to this office.
- 4.(a). Ease of access. Prefer not far from a railway but at least access by a good road.
- (b). Near a settled township. (no difficulty in obtaining suitable residences for staff).
- (c). Near an existing telegraph line.
5. Suitable from a wireless point of view by the engineer for the contractors, but his objections should be stated specifically and fully weighed in light of local conditions.
6. The engineer for the contractors is to indicate the effect of the site on his equipment.
7. Any amendments to the contract are to be dealt with by the Central Office.
8. The points to which the engineer for the contractors will direct specific interest are -
 - (a). facility for obtaining a good earth.
 - (b). area free from trees.
9. If the engineer for the Company considers the site selected will need use of a counterpoise, this point should be specially investigated. If at all possible a direct earth should be retained. If a counterpoise is used it will be necessary to see site free from unwanted trespassers, in certain circumstances it may be dangerous to life. If counterpoise is used site will require to be properly fenced.

On the 16th August the The Electrical Engineer was instructed to liase with Captain Cresswell, Director of Commonwealth Naval Forces. The Australian Wireless Limited had also been asked to have a representative to accompany Captain Cresswell.

Nine sites were inspected. All except one were within 5 miles of the Fremantle Post Office.

Captain Cresswell personally inspected four. The lot were inspected by Lieutenant Slee R.N., Mr Moens, and the Electrical Engineer. Mr Moens was the representative of the Australian Wireless Company.

Mr. Moens advised that the site would need to be 500 yards by 500 yards, equal to about 52 acres if away from the coast or half that size if near the sea. Details of the sites investigated and the recommendations are included in appendix 2. The recommended site was at Applecross.

In March 1911 the Works Director was requesting payment for the clearing of the site although in January 1912 in a heat of 106 degrees farenheit there were eleven axemen on the job clearing away the trees to allow the erection of the aerials. Presumably the earlier clearing was to allow

construction of the residences and other buildings to proceed.

The Applecross station was completed on the 30th September 1912. The equipment in the station varied over the years to meet the changing demands on the station as well as changes in the technology. The broad details of these changes are known, however much detailed information on the plant has not been determined. It seems important for historical purposes that the matter be researched further. The only parts of the wireless equipment which once (at whatever time) formed part of the wireless equipment at Wireless Hill and remain at Wireless Hill on display are a large coil former which formed part of an antennae coil and a broken glass insulator disc from the base of the mast. The last known report of the Telefunken receiver, transmitting key and tape machine appeared in the The Broadcaster Annual of 1934 where it showed a picture of these items at the University of Western Australia.

There are various files in the Commonwealth Archives in Melbourne dealing with the initial period when the station was under the control of the Post Master General but which are not accessible from Perth. These deal with among other things - Accumulators 1915-1916, Repairs to battery room floor 1914, Repainting quarters 1914, Buggy shed and stables 1912-1914, Laying of gravel in front of buggy shed and stables 1914, Payments 1912-1913, etc. It is quite possible that these may indicate better the premises at that time. The knowledge of these files has brought to light the subjects of the battery room and the existence of the buggy shed and stables and has enabled these subjects to be addressed. The exact date of construction of a third building forming part of the station itself and the purpose for which it was originally put are not known precisely. A search of these documents may confirm the position of the buggy shed and the purpose and date of construction of the third building as well as revealing other pertinent information not presently known.

There is no record in the Commonwealth Archives computer of material relating to the period from 1915 to 1919 whilst under the control of the Navy, at least it may be there but has not been found. Mrs. Linley Batterham, while preparing a paper tracing through the significant dates in the history of Wireless Hill approached the Department of the Navy in Canberra seeking access to the documents of the period and either the material was not available or had not been released.

The original wireless equipment was supplied by Telefunken to meet a specified performance. The transmitter was a 25 kw. quenched spark type. There is a photograph undated and un-named at the Wireless Hill Museum of what is obviously an arc transmitter being erected in the south west corner of the H.T. room of the Operator's House. A copy of the photograph is included in appendix 6 and this is obviously the Telefunken spark unit. The equipment included five large spiral coils of copper section supported on insulators down

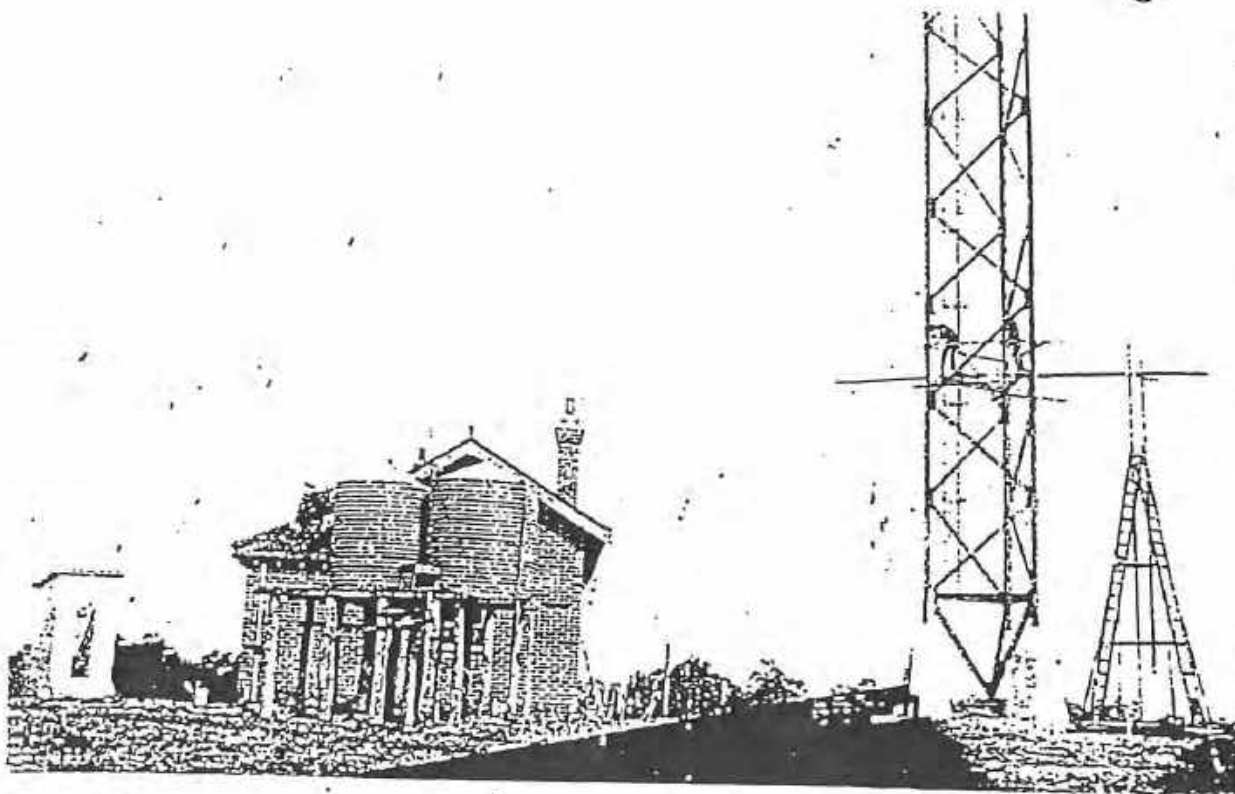


Fig 1. Erection of a new wireless mast at Applecross,
April 1911.

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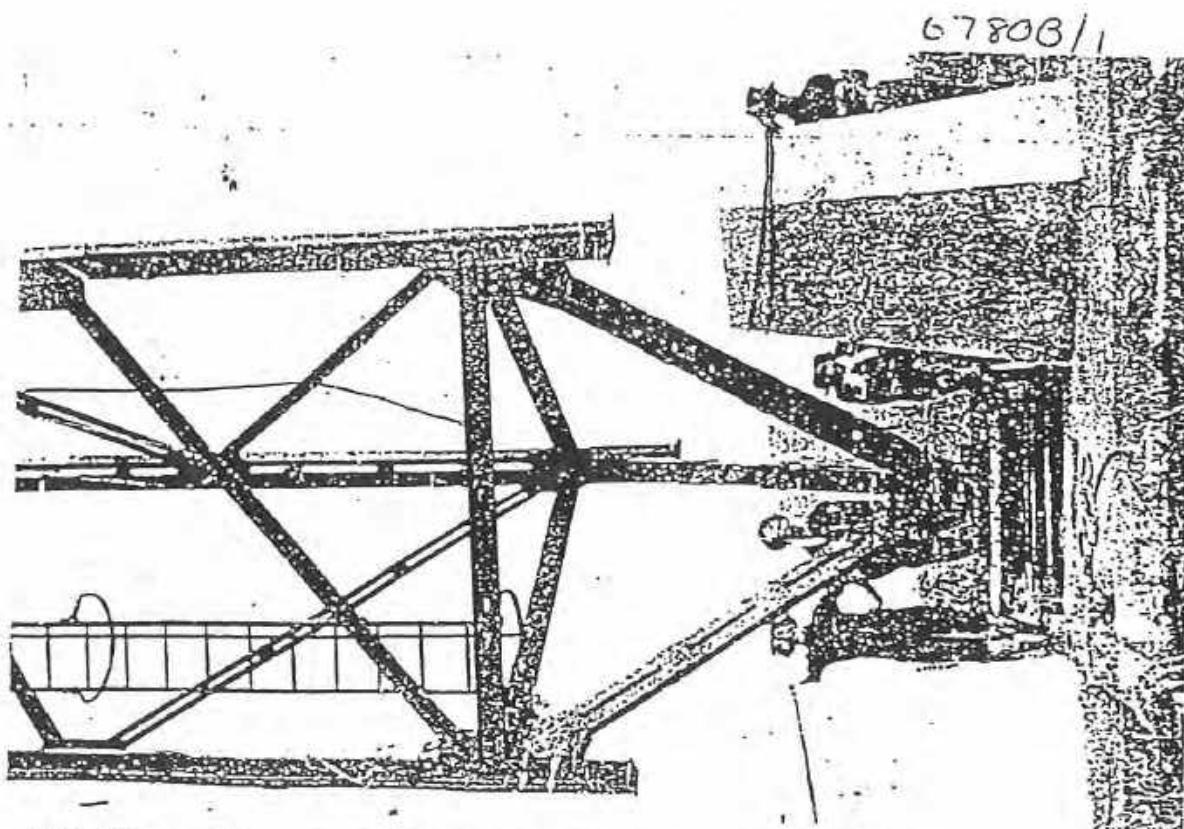


Fig 2. Erection of a new wireless mast at Applecross,
April 1911.

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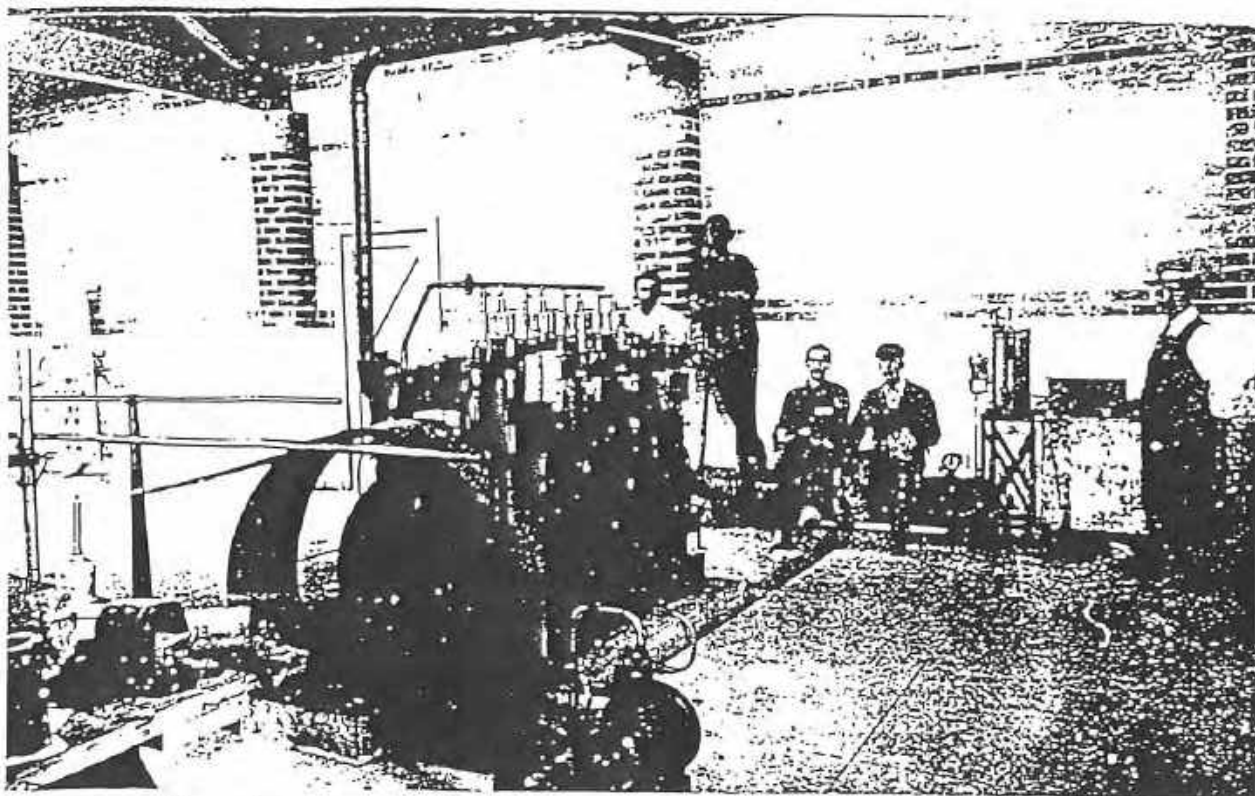


Fig 3. Engine room showing Gardner Engine. c.1912.

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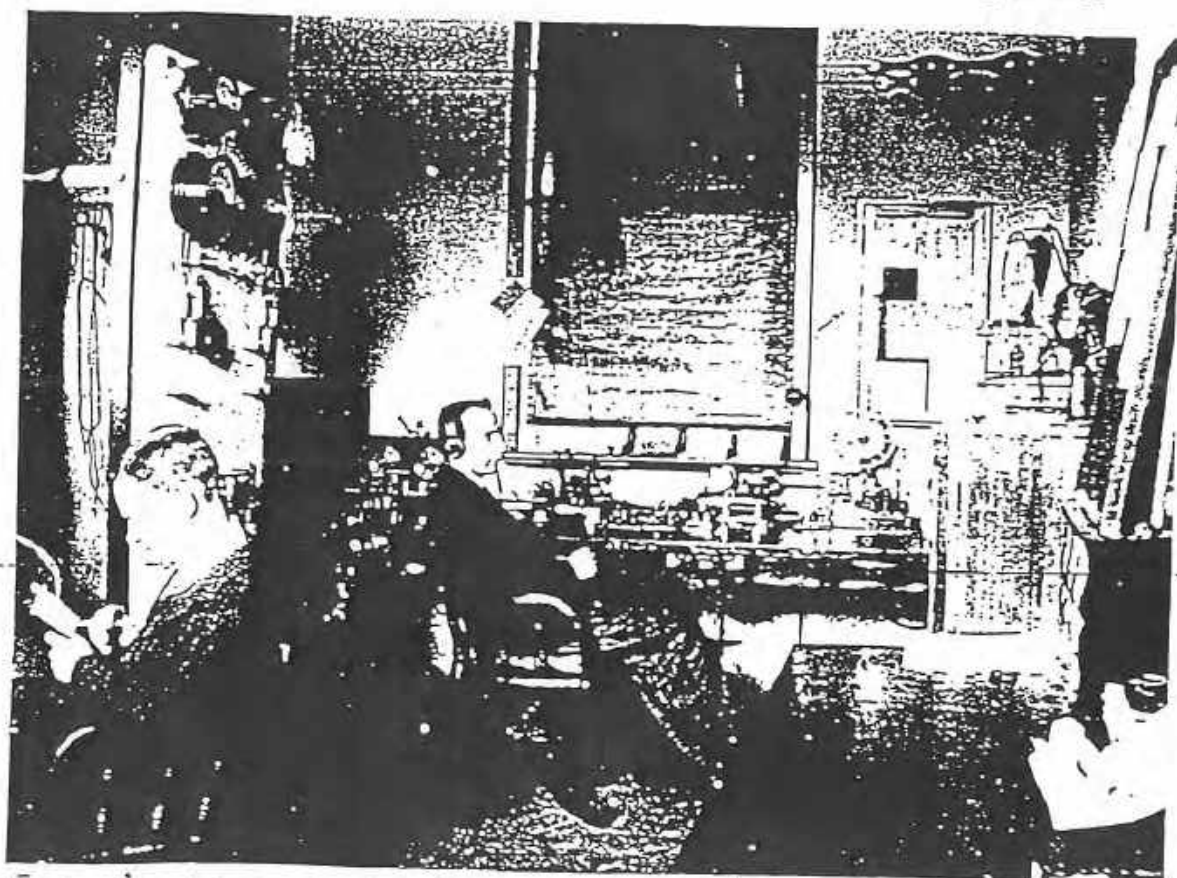


Fig 4. Operators in the 'Operation room' at Wireless Hill.
c.1916.

Reproduced by courtesy Battye Library. 8989B.

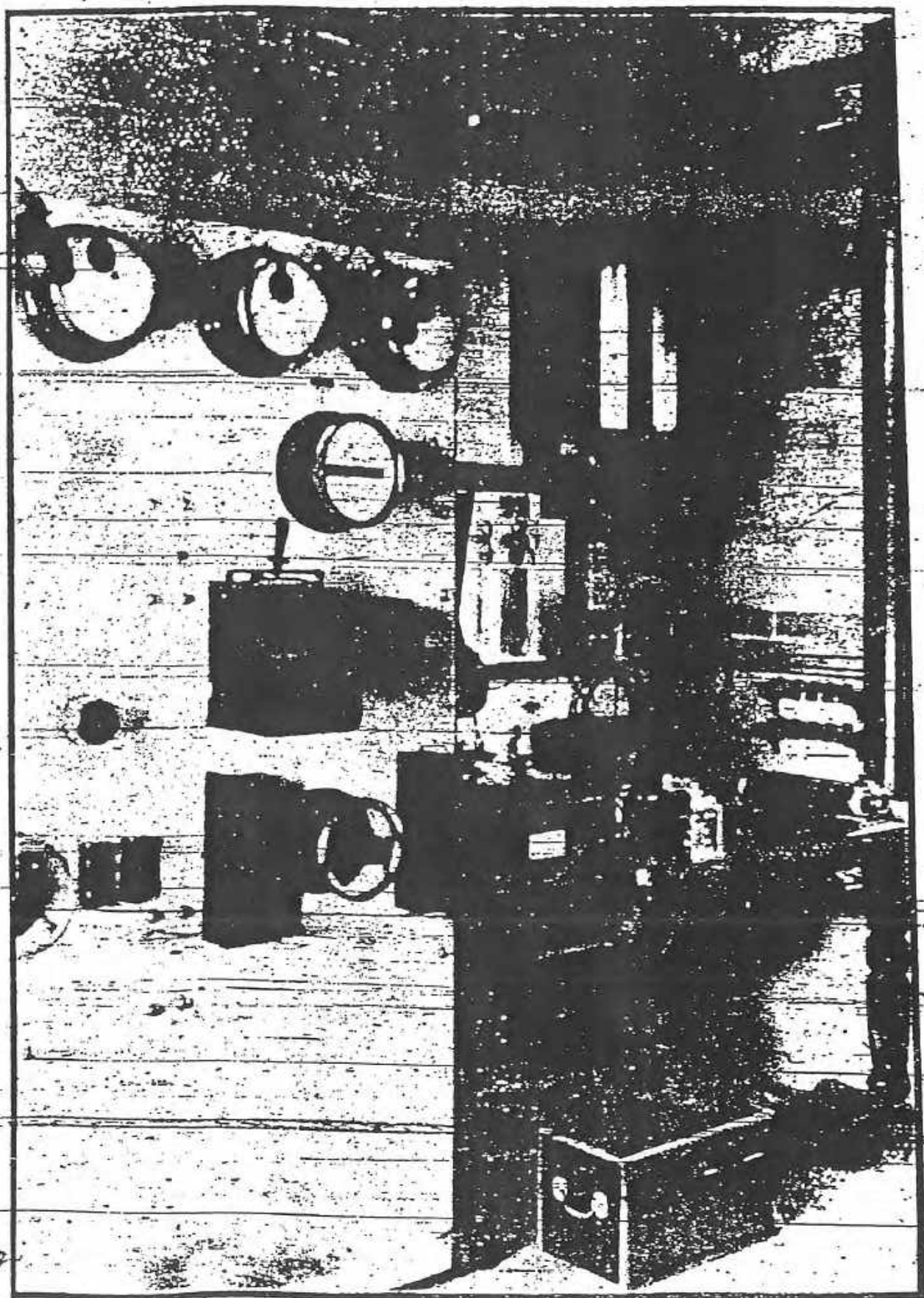
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from the roof, two large capacitors in cans on the floor, a meter suspended in mid air on the bus bars, and the arc unit which was about a 1 metre cube (referred to in the construction reports as an arc table) sitting on the floor. The arc unit had three centrifugal fans in the base and what looks like six arc chambers on the top. In "Seavatch" by Lawrence Durrant (page 25) there is a photograph of an identical transmitter used for marine operations at Pennant Hills, titled "The air cooled spark transmitter used for marine operations at Sydney Radio, Pennant Hills in 1916 (O.T.C.). O.T.C. have been contacted and cannot confirm or otherwise the type of transmitter. There is an identical picture in the April 1989 issue of Electronics Australia which they positively identify as the original Telefunken apparatus. No details are known of the original receiving set or rather the projected receiver except that the electrical mechanic, Mr Johnston sent from Sydney to install the equipment, manufactured a substitute detector using Galena ore from Northampton to improve the sensitivity so that the station could meet the specified requirements. It was obviously a sophisticated crystal receiver. In "Engineering" of Sept 8, 1911 Professor G.W.O.Howe said "The magnetic detector used by the Marconi Company is ideal in its simplicity and reliability, but is not as sensitive as the electrolytic or mineral contact detector. The Telefunken Company have recently given up the electrolytic detector in favour of a detector of the latter type". On the 19/1/1912 it was reported some tests had been made of the receiving apparatus at Applecross but that no further tests had been made due to several glass vessels having cracked in transit to W.A. Perhaps this is why Johnston had to make up a crystal detector using Galena ore from W.A. and not due to a lack of sensitivity of the original detector. The glass containers could have housed the electrolytic detectors.

Mr Johnston in his memoirs quoted the specification as requiring the station to communicate with Sydney during daylight on a wavelength of 2,000 metres and with a ship at sea distant 500 miles on 600 metres. This does not quite tie in with the 1,250 miles quoted in an article in the West Australian of the 26th of September 1912 when it stated that "Before the contract was deemed to be complete the station would have to demonstrate that ethergrams could be sent by day a distance of 1,250 miles. The range of 1,250 miles is supported by the records in the Commonwealth Archives in Perth. Mr Johnston was involved with the installation of a number of installations around Australia and he could have been confused. The stations at Sydney and Perth were more powerful than the remainder and it is understood it was hoped that they would be able to communicate with one another. "The Seawatchers" says "The stations in Sydney and Perth were equipped, in addition, to operate on a frequency of about 125 kHz, using high transmission power. A 125 kHz frequency has a wavelength of 2,400 metres which is somewhat different from Johnston's 2000 metres. The point being made is that a lot of the information floating around needs to be carefully assessed.

ed, which in the case of the tower support
weight of over 120 tons. Close to
the tower are placed the offices for the
operators, and the engine-room with its
battery and other machinery. An area of
10 chains in diameter has been set apart for
the receiving zone, and outside of this are

to send and receive messages. When a steam-
er gets into communication with the Perth
station's waves, a bell automatically warns
the operator, one of whom will always be on
duty. The whole of the block is to be en-
closed with a 6ft. picket fence, with large
entrance gates from the Fremantle road.



WESTERN MAIL 17/2/1912

Fig 5. The Operating Room. 1912. Western Mail 17/2/1912
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The electric power for each station was supplied by 60 hp Gardiner engines driving 500 cycle alternators (Electronics Australia). Joseph Murray Johnston, the installer, refers to a 75 hp engine driving a high frequency alternator. High frequency electricity was one of the methods used to power spark transmitters and this formed part of the Telefunken transmitting system. There would also need to be an exciter to generate the direct current to provide the excitation for the alternator. In the construction reports in the Perth Archives the main engine appears to have driven the alternator, the exciter and an air compressor via separate driving belts. There is one mention of an exciter engine however this could be a mistake. Later on in the reports reference to the exciter is absent and reference is made to a D.C. generator. Perhaps this implies the exciter was more than just an exciter and also served to charge the accumulators in the battery room and run the lights, etc. In a photograph of the operators room in 1912 there is a double panelled switchboard alongside the Telefunken receiving apparatus. On one panel is an ammeter, a voltmeter (indicating two hundred volts), a frequency meter registering 500 cycles, a main switch, and a regulating handle. On the other panel is a voltmeter, two ammeters, four fuses (2 pairs of fuses as in a D.C. circuit), two small switches (one smaller than the other), and another regulating handle. The first panel is obviously the output of the 500 cycle alternator for supplying the transmitter. The second panel would seem to be a D.C. supply generated on site and controlled from the operators room.

The West Australian of January 29th 1912 reported - "The erection of the tower and the installation of the necessary plant are in the hands of the Australian Wireless Company under contract with the Federal Government but all other works in foundations, earthworks, roads and buildings are being carried out for the Commonwealth authorities by the Architectural Division of the Public Works Department of Western Australia of which Mr. Hillson Beasley is the head. The works are now approaching completion and it is expected that the installation will be in full working order by the middle of March.

The main mast or tower made of latticed steel is 394 feet high and the concrete beds for this as well as for the steel guy anchorages have been constructed by the State Public Works Department. The tower and guys are insulated by strong glass discs which in the case of the tower support a weight of over 120 tons. Close to the tower are placed the offices for the operators and the engine room with its battery and other machinery. An area 30 chains in diameter has been set apart for the receiving zone and outside of this are detached quarters for the superintendent and head fitter and a block for the six single men who will be required as operators. The buildings are of red brick with half timbered gables and tiled roofs. Every provision has been made for the comfort of the men who will in turn be liable to be called on at any moment during the day or night to send and receive messages."

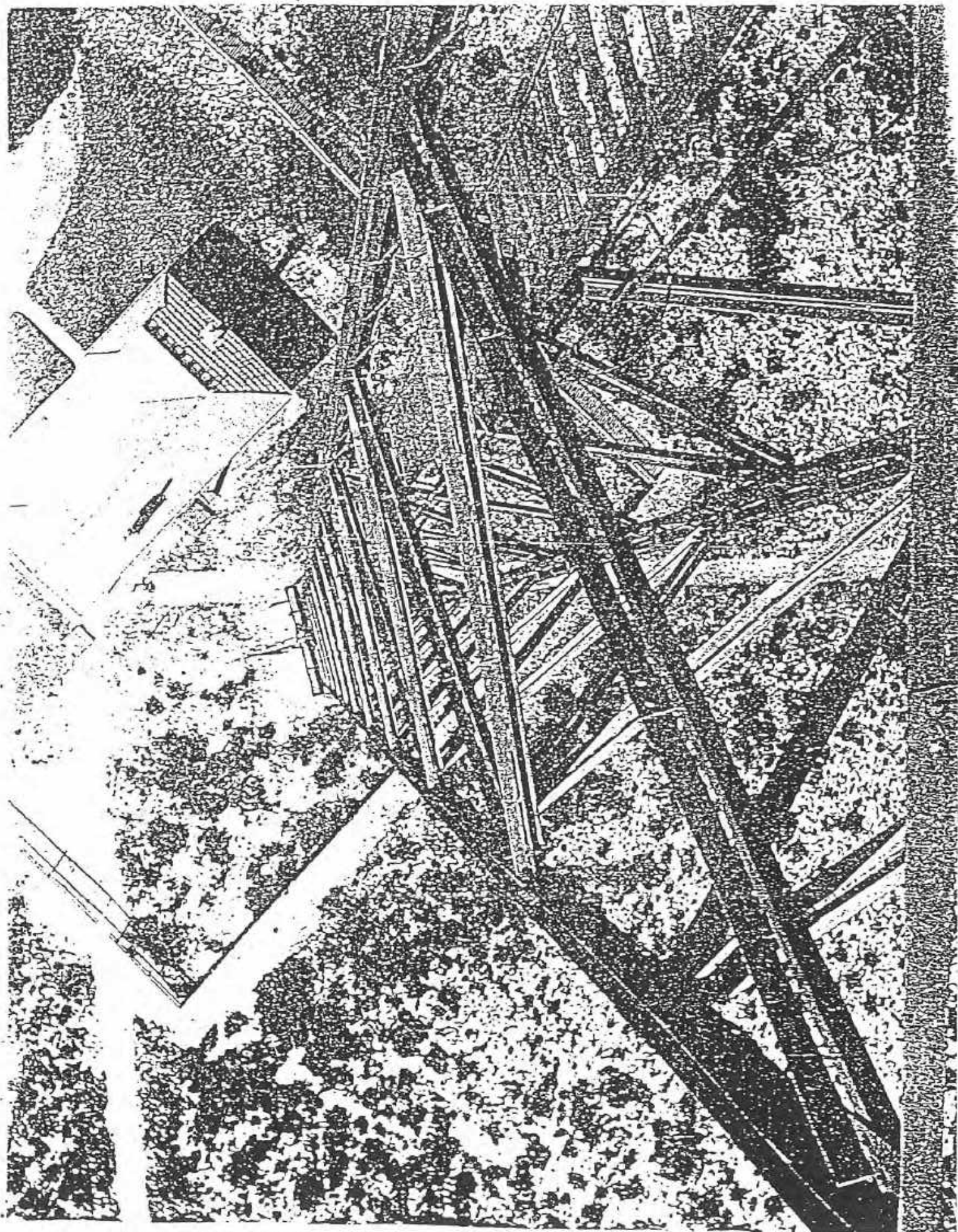


Fig 6. View looking down from up the mast. c.1920.
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Melville

The West Australian of July 22 1922 also reported - " The mast which is built of mild german steel weight 120 tons. It is fashioned on the lattice work principle, and is triangular in build , working on a ball and socket pivot, which allows for a certain amount of movement. The whole huge structure rests on insulators, three tiers of them, made of glass and separated from one another by sheets of lead. It gives one a new respect for glass to learn that these insulators carry the whole weight of the mast and something more for when the pull of six great guys or stays is counted in, the total pressure on the insulators is not less than 150 tons. The stays are attached to the mast by glass insulators, and to the earth (with insulators again) by three massive concrete anchor - boxes each weighing about 200 tons. The mast itself plants its glass feet on a foundation of concrete 16 feet deep. It may be mentioned that during the war the anchor boxes had to be CLOSELY GUARDED by day and night, for if one of the stays had been cut the whole mast might easily have collapsed."

To further get an impression of the scale of the mast there is a photograph of the members of the military detachment which guarded the wireless station during the Great War in front of the base of the mast. By scaling with respect to the human figure the sides of the mast would appear to be approximately 2.6 metres across.

The article in the West Australian of July 1922 continues on to say - "The only objection to Applecross as a site for a wireless station appears to be the sandy soil, which becomes excessively dry. To meet this defect a network of thousands of lengths of copper wire has been laid a few inches under the surface. This is technically known as "counterpoise" and its function is to improve the conductivity of the earth."

There is no mention in the construction reports of 1912 of a buried earth mat. This would have been a significant task requiring quite a lot of labour and if it were done it should have been reported. That is not to say it was not done. The inference is that there was no buried earthmat or "counterpoise" in newspaper language in 1912. Tom Berg a Radio Amateur and a committee member of the Wireless Hill Museum confirms one existed, copper wires were dug up during landscaping on the site, and consequently it would have had to be installed subsequent to the start of the station. Criteria 9 for the selection of the site said it was desirable to select a site where a good earth could be obtained otherwise a counterpoise would have to be laid. In certain circumstance this could be dangerous to life and a fence would be required around the whole site. This is what happened. In the files at Perth Archives is correspondence re the inspection of jarrah poles for sustaining the counterpoise wires. There were 24 inner poles each 24 feet long, and 24 outer poles each 18 feet long, presumably protruding 18 and 12 feet respectively above the ground. Somewhere it is stated the inner poles support the wires only and the outer poles have a strain of 400 pounds at the

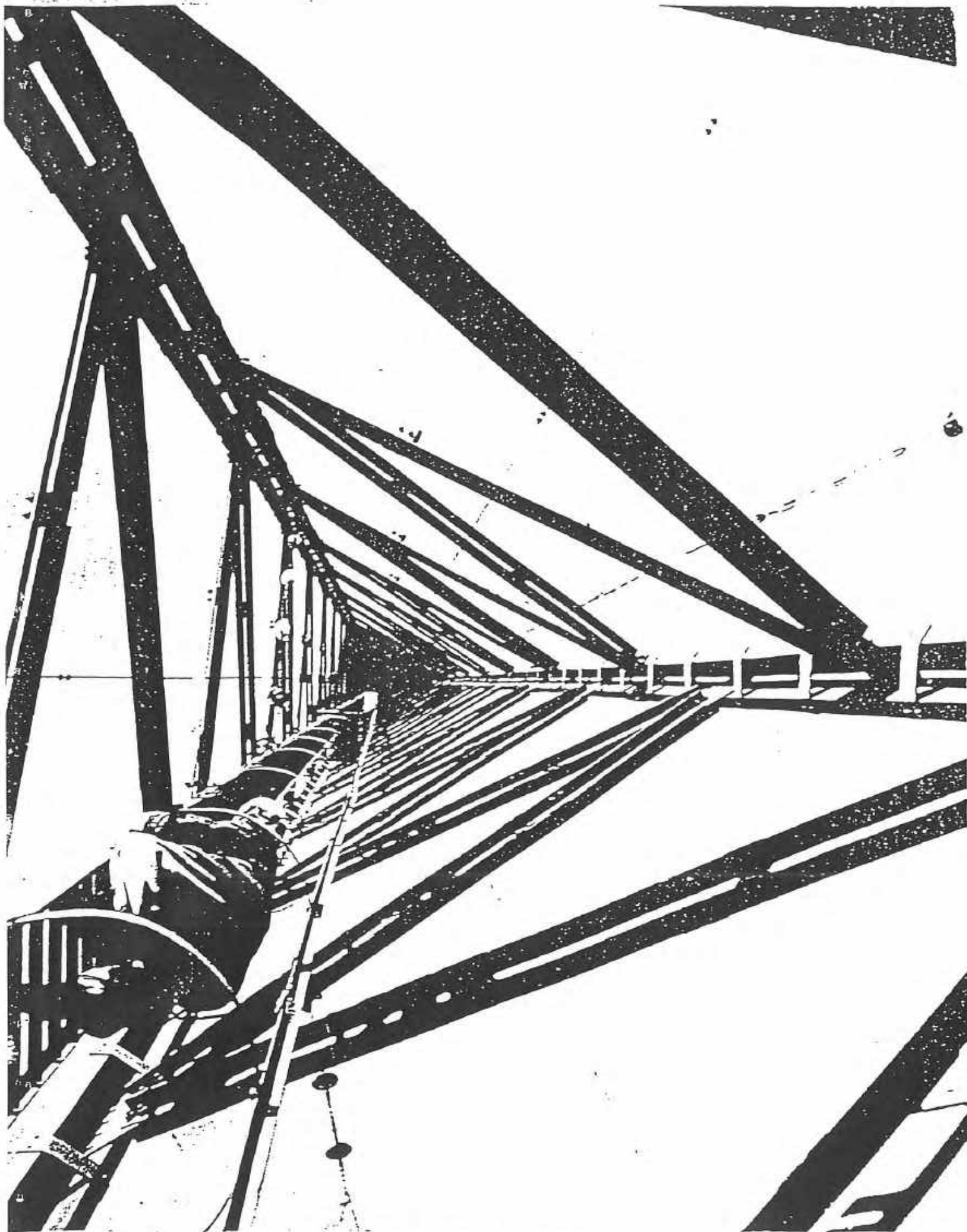


Fig 7. View looking up the mast. c.1920.
Reproduced by courtesy Wireless Hill Museum, City of Melville

top and are additionally stayed with galvanised stay plates and rods.

On 29/3/1912 the Electrical Engineer visited the site to see that the telegraph line cleared the counterpoise wires. His recommendation to Melbourne was that the telegraph line be undergrounded and this was agreed to on the 6/5/1912 for a distance of 1,500 meters.

Tom Berg says a counterpoise is a kind of artificial ground plane for the mast, and formed of suspended wires. This ties in with the reports regarding the supply and erection of the posts. Wires come off the mast at a low level and radiate out in some fashion and terminate on the 18 foot (12 foot above ground) outer poles, and that is why the poles have to withstand a pull of 400 pounds and need to be stayed. On the 26/4/1912 the counterpoise posts were being erected along the roadway up to the station. We know where the roadway was, so this gives us the radius of the outer ring of posts. Because the counterpoise is so close to the ground and because of the length it has to run away from the mast it would touch the ground in the middle of its run if it were not otherwise supported. The inner ring of posts would then be placed somewhere about mid way between the outer posts and the mast to raise the wires away from the ground. The counterpoise would suspend from but be electrically isolated from the mast. The low height of the counterpoise wires would explain the necessity for putting the telegraph lines underground from the aspects of physical impediment, safety, and possible signal interference. On the 22/2/1912 the counterpoise lead in insulator was placed in position and connected in the H.T. room. On the 24/6/1912 a counterpoise earth switch was being installed in the H.T. room. In the case of an electrical storm it would be safer with the counterpoise earthed. On the 26/8/1912 the counterpoise was connected temporarily to earth for experimental reasons and again on the 27/9/1912.

Material for the construction of the site was carried up river on barges and landed at "German jetty" immediately below Wireless Hill and then hauled up to the top by bullock teams. Jack Sullivan can recall the jetty when a child in the 1930's. It has since disappeared.

It would be expected that a metal mast sticking up in the air 400 feet above the ground in a prominent position would prove subject to lightning strikes and this would seem to have been the case. Jack Gabbertas an ex Nicholsons employee and an amateur operator of many years standing recalls visiting the station in 1934 or 1935 and understands there were problems with lightning. At the time, Syd Trim the A.W.A. Superintendant was there and said there was more electricity coming down the mast than going up. They had procedures to deal with it. In the original construction reports there was a lightning conductor on the mast connected to an earth plate via an earth switch fixed to the foundation of the mast. This was not to stop the lightning but to save the insulator and apparatus connected to the mast from being destroyed by the excess voltage and current caused by a lightning strike.

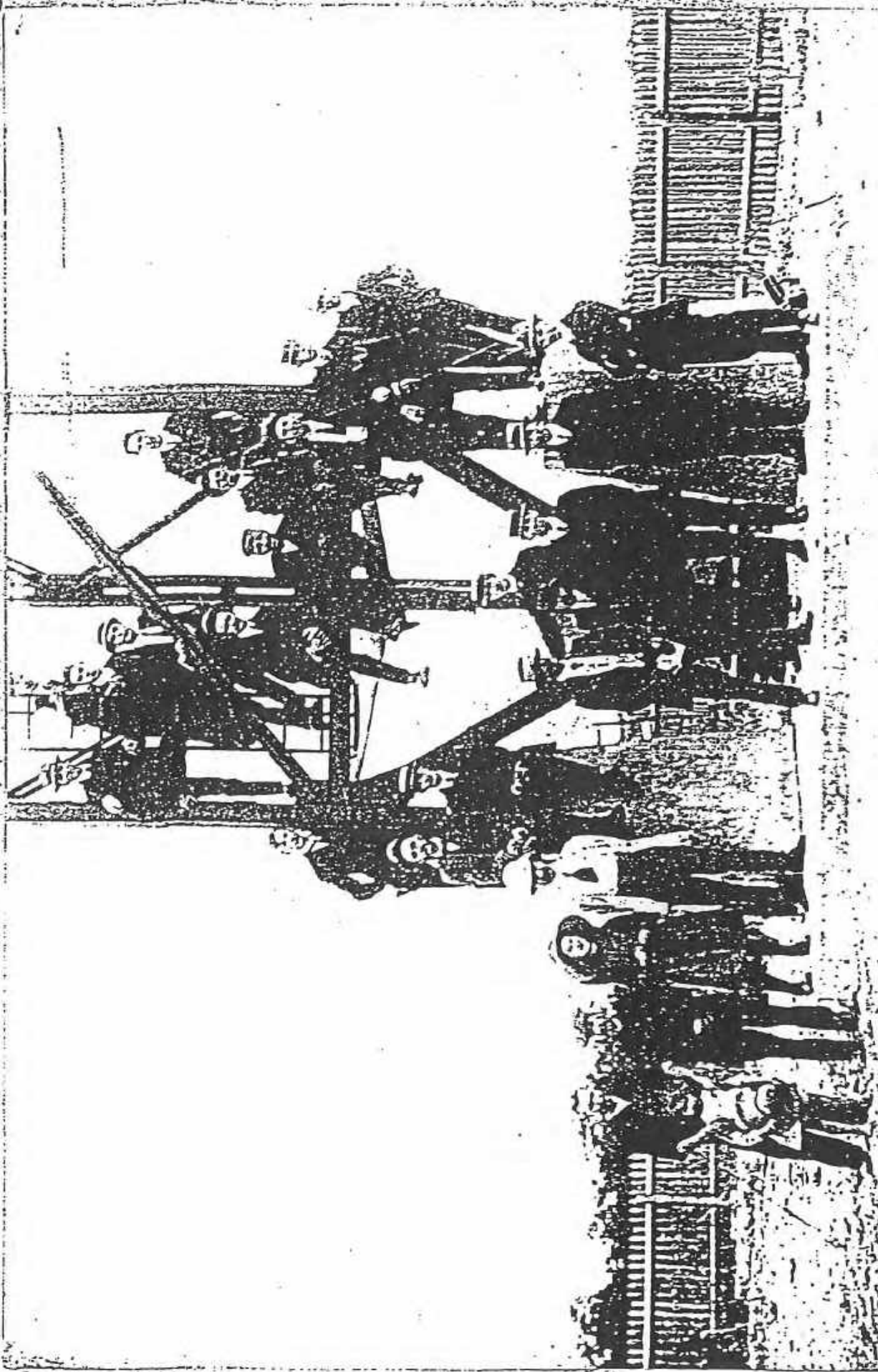


Fig 8. Probably construction workers grouped at base of mast
early 1912.

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Melville.

Doug Rickman a keen sailor and supporter of the Sea Scouts recalls sitting with Hal McKail (Commissioner of the Sea Scouts) at the Sea Scouts look out tower, Pelican Point, in the 1930's and watching a spectacular lightning display on the Wireless Hill mast. He said it was that sort of a night that felt like electricity was in the air. There seemed to be a flashover from the top of a stay to the middle followed by one from the middle to the bottom and then from the bottom to ground. Each stay did this in random order and repeatedly.

The Wireless Station commenced operations under the control of the Post Master General's Department. Further information relevant to this period should be available on access to the Commonwealth Archives in Victoria.

During the Great War of 1914 - 1918, the Navy considered it should have overall control of war time wireless. Early in the war a Post Office operator sent out an uncoded message regarding a troop carrier thereby placing the troops and the ship at risk. Control of wireless telegraphy throughout the nation passed to the navy during the latter half of 1915. In point of fact the existing operators were given commissions in the Navy. See above re guarding of the anchor boxes by the army during the war.

1914 -1915. During the early part of the war, Australia's coastal stations at Pennant Hills, Applecross, and Townsville were equipped with valve receivers for the first time ,thus making possible the interception of European transmissions, especially from the powerful German station at Nauen, near Berlin. German propaganda messages were copied daily in Australia.(Electronics.Australia). The receipt of these signals by Applecross apparently sparked the idea that direct communications were possible between England and Australia culminating in the establishment of the short wave "Beam System" between Britain and Australia in 1927. This then had some effect on the development of the role of the Perth Wireless Station in the ensuing years. The English "Norman" committee had recommended a chain of relay stations between the two countries and this was not acceptable to the Australians.

George Moss an early amateur remembers visiting the station in 1922 as a member of the Fremantle Radio club and the operator showed them a valve with a glowing filament hidden away and reportedly being used unbeknown to the powers that be. This was the first valve he had seen. It could be the operator was playing tricks with the impressionable youth.

In 1915 Applecross received a signal from Cocos giving the position of the German warship Emden enabling its subsequent destruction. Janet Wainwright, West Australian 16/12/1976. This is not the story portrayed in "Cable and Wireless, Girdle Round the Earth". Applecross does not gain a mention. It would seem logical that Applecross would be listening into Cocos's frequency, and also that Applecross would be in contact with the Sydney. In "Taming the Tyrant", the story

8986B

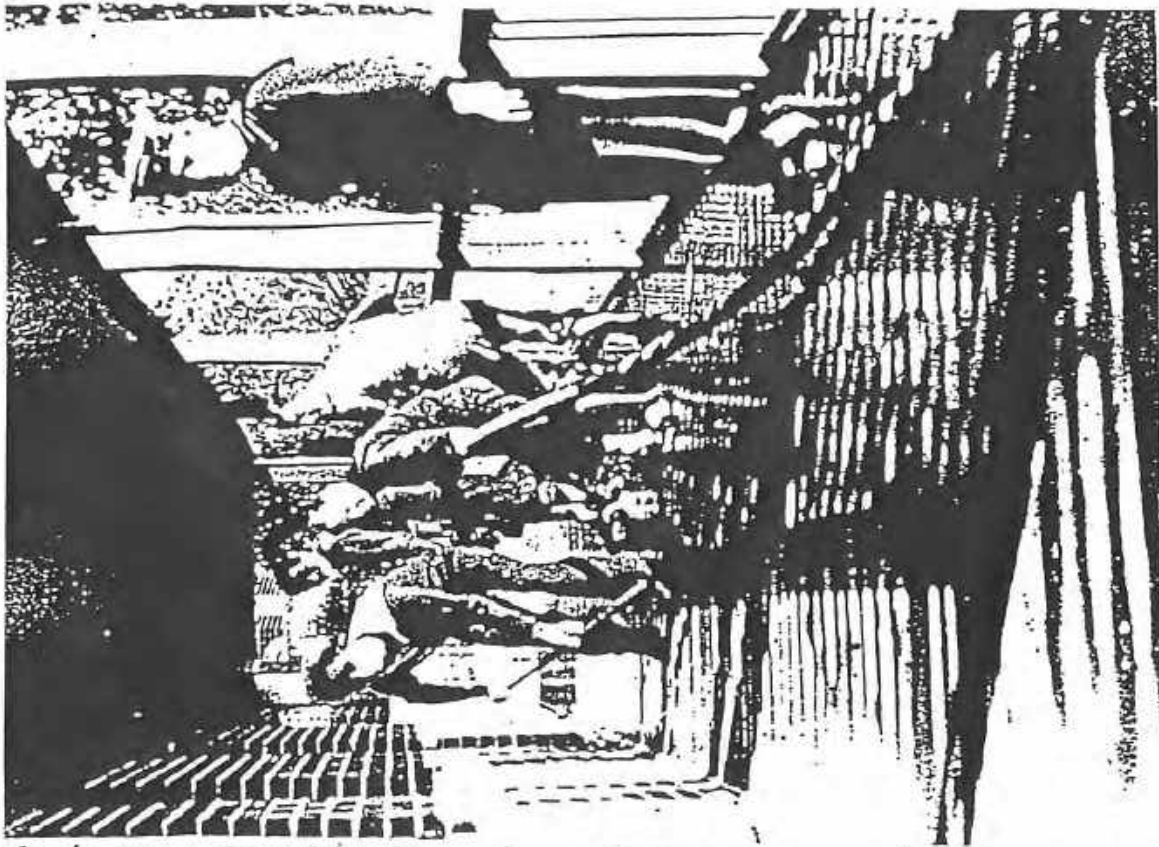


Fig 9. Battye 8986B. Sailors scrubbing the verandahs of houses at Wireless Hill. c.1916.

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8987B

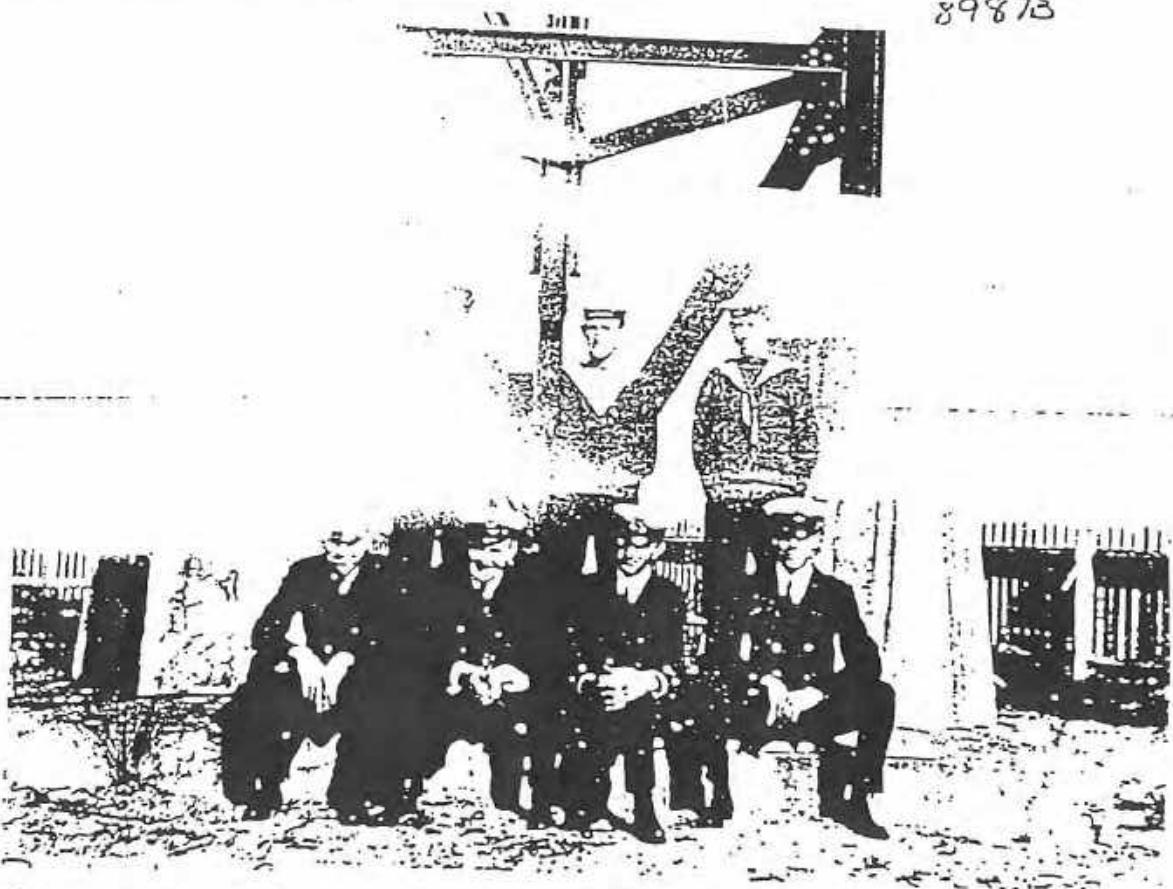


Fig 10. Battye 8987B. Portrait of a group of Sailors who worked the station during World War 1 seated at base of mast.

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of the first 100 years of Australia's international telegraphic services, it says :- "The wireless S.O.S. call, which identified Emden, was heard not only at Perth but also by the naval escorts of the convoy carrying the first contingent of Australian and New Zealand troops, which was then only some 50 miles east of Cocos. Detached from the convoy, H.M.A.S. Sydney destroyed Emden". The Radiogram of February 1930 carried an article on the "Sinking of the Emden" and in it they said that the wireless message was received from Cocos by Mr Mat Clifford, a wireless operator on the Sydney. This has been corroborated by his son. The subject does not warrant a mention in "The Seawatchers, The Story of Australia's Coast Radio Service".

The "Broadcaster Annual of 1934" carried an article on Perth's Radio Centre and reported, "On the outbreak of war, the plant was taken over by the navy, which added to the equipment a 60 kilowatt Poulsen arc set, and made arrangements with the Government Electricity Department to secure power. Seventy five K.V.A. transformers were supplied, breaking down 20,000 volts to 440 volts in V.I.P.'s. own sub station." (The original station designation of POP was changed to VIP.)

The Broadcaster also said the old original power source has been kept as an emergency unit. (See later remarks). (The Electricity and Gas Department installed a 40 cycle alternator at East Perth in 1916 and constructed a 20,000 volt distribution link to Fremantle along Canning Road past the wireless station and the wireless station would have been connected to the supply at that time. D.Rickman).

The Telefunken transmitter as with most other transmitters of the period gave out a non continuous sequence of wireless waves. The energy was only transmitted whenever the sending key was depressed and then only as a series of pulses with a repetition rate of twice the frequency of the power source. With a 500 cycle alternator the repetition rate would be 1,000 times a second giving a musical note of 1000 cycles per second in the receiver (see Engineering page 337, Sept. 8, 1911). The information which could be transmitted over a channel was limited because of the intermittent nature of the waves and the consequently small proportion of the elapsed time over which the waves were transmitted. With a continuous wave transmitter the whole of the time would be available for the sending of information and as well the information conveyed could be greatly increased by speeding up the sending rate.

A "Poulsen arc" was one way of generating continuous waves. W.Duddell in England in 1900 put a coil in series with a condenser across the terminals of a carbon arc and noticed it created a musical note. By changing the size of the condenser and the coil he could change the tone of his "singing arc". Valdemar Poulsen of Copenhagen in 1902 raised the frequency of Duddell's singing arc sufficiently high for wireless purposes by placing the flame of the arc in a strong magnetic field and burning the arc in an atmosphere of hydrogen or coal gas. In 1912 more than 100 words per minute had been transmitted by this system. In "Seawatch"

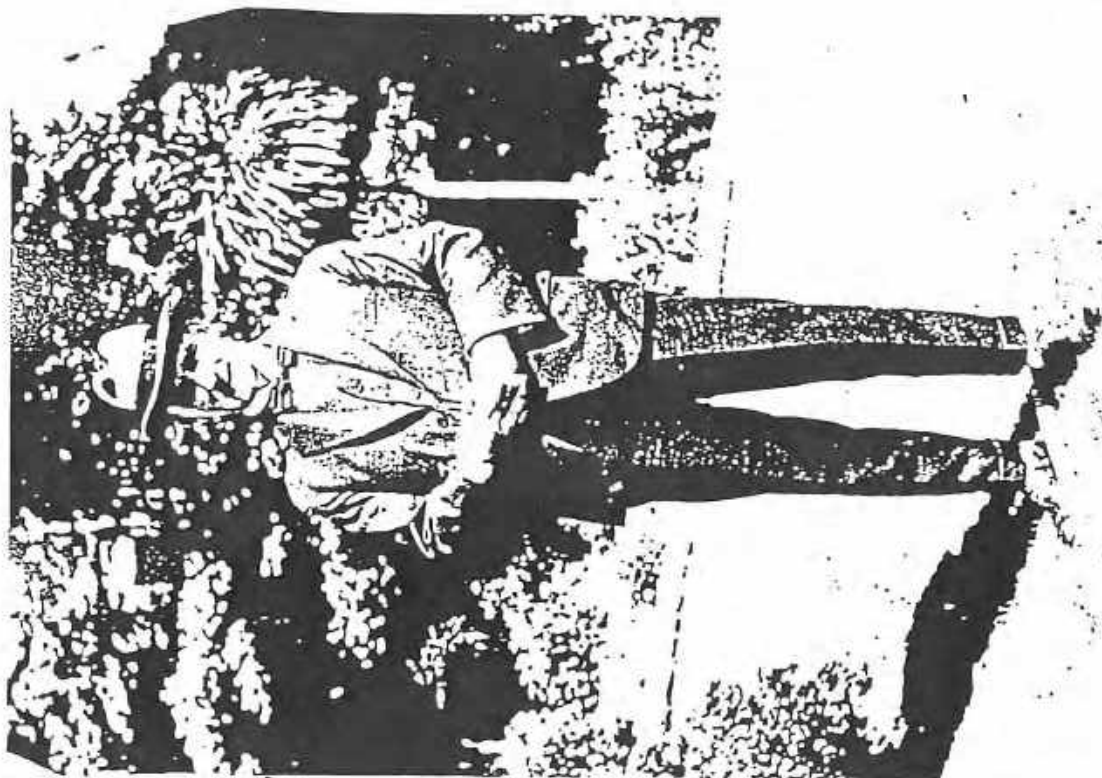


Fig 11. Battye 8990B. Mr Wolfe who was a telegraph operator at Wireless Hill for a period of time. c 1920. Reproduced by courtesy Battye Library. Not to be further reproduced for any purpose without the written consent of the Library Board of Western Australia.

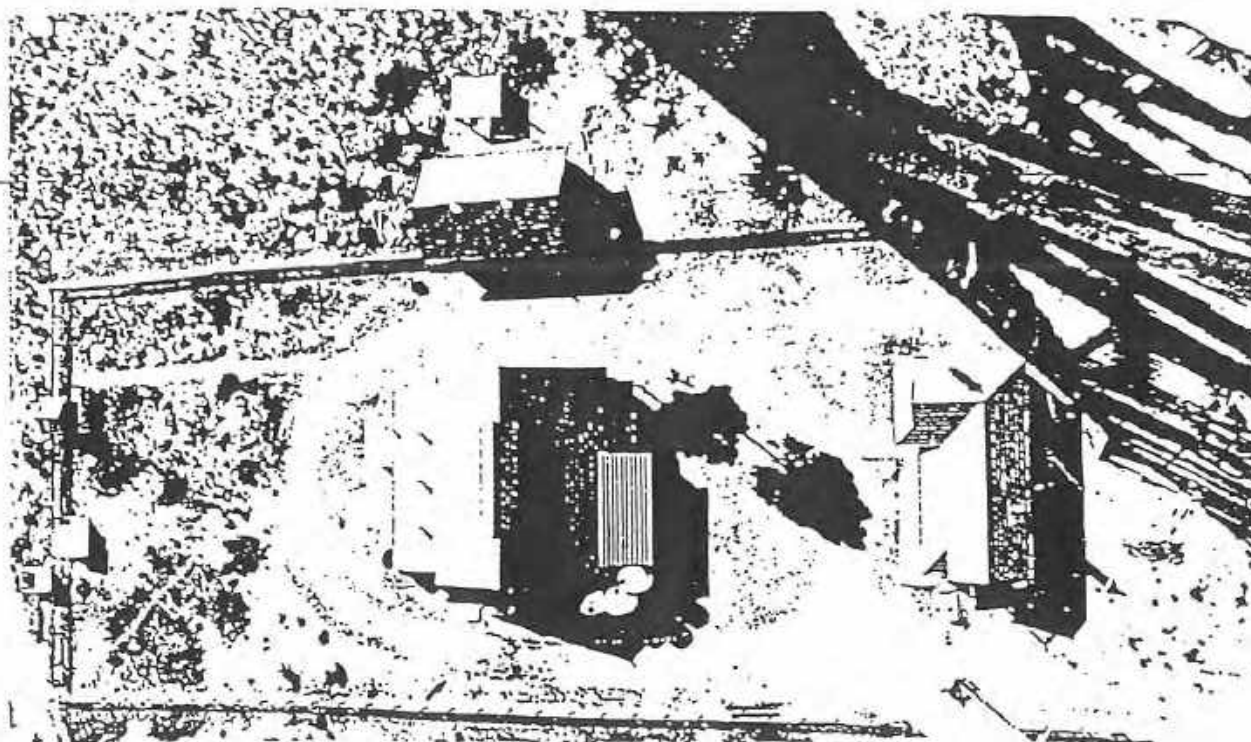


Fig 12. Battye 8991B. Applecross Telegraph Station building. c 1920.

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there is reference to setting up an arc transmitter on a ship. The hydrogen atmosphere was generated by dripping alcohol onto a hot plate in the arc chamber. No details of the Poulsen transmitter installed by the navy at Applecross can be found.

On the 14th September 1920 the West Australian reported that "during the next few days, control of the various wireless stations throughout Australia would revert to the Post Master General's Department". The Navy in the national interest seems to have been rather reluctant to relinquish control of wireless communications after the cessation of hostilities.

On the 2/3/1921 the West Australian reported on the increasing value in the use of wireless telegraphy, particularly the newly developed Continuous wave equipment with which the Marconi Company is fitting out important vessels. This is being demonstrated by the work of the wireless station at Applecross. Spoke to the S.S. Aeneas when 3,570 miles distance. 3,570 miles is a record for a ship with C.W. on the Australian coast. The operating range of the station had been extended significantly due to the more efficient equipment on the ships.

On March 22nd 1922 the Commonwealth Government signed an agreement with Amalgamated Wireless Australasia whereby A.W.A. would institute a direct wireless link with England and Canada from a main station in Victoria or New South Wales and at the same time A.W.A. would take over the existing operations of all other wireless telegraph stations in Australia and extend their function by using them as feeder stations to the main station for international traffic. This included Applecross. At that time Applecross would have still been operating as a coastal station only. The international service did not commence until 1926 and the feeder role presumably did not commence until that time. Control of the Applecross station thus passed to Amalgamated Wireless Australasia, Limited. As Part of the agreement the Commonwealth Government assumed a 50 per cent interest in A.W.A. The four year lag in the commencement of the international service was due in part to delays in approvals at the British end and the development of the short wave beam system.

On the 22nd of July 1922 the reporter from the West Australian visiting the station reported "A breakdown in the supply of current from Perth would not seriously interfere with the working of the station, which possesses a power house of its own containing among other machinery, two motor generators, an alternator, and a 50 hp. motor all made by the Weymouth Co. of Melbourne. It is a relief to see part of the equipment which is not German in origin."

The original Telefunken transmitter was powered by a diesel driven alternator. Because there was no electric power reticulated to the site or if there was, none of sufficient capacity to drive the transmitter, the original power requirements had to be generated on site. When A.C. power

8984B



Fig 13. Battye 8984B. Portrait of sentries who guarded the Applecross (Wireless Hill) Telegraph Station. Reproduced by courtesy Battye Library. Not to be further reproduced for any purpose without the written consent of the Library Board of Western Australia.

8985B



Fig 14. Battye 8985B. Accommodation for the wireless operators at Wireless Hill. Reproduced by courtesy Battye Library. Not to be further reproduced for any purpose without the written consent of the Library Board of Western Australia.

from the supply authority was connected to the site in 1916, because of the technology of the day, rotating machinery was still required to generate the specific type of electric power required by the transmitters (voltage, current, frequency), and the power house was equipped with a number of electric motors driving generating sets for that purpose. The number of these varied over time to suit the transmitters installed. A picture of 1921 vintage indicated six or seven separate pieces of generating machinery. The Broadcaster Annual of 1934 reported "The old original power source has been kept as an emergency unit for this apparatus. There is also a small auxiliary set driven by a small "Chapman Pup" engine of a type familiar to motor boat enthusiasts. VIP is very proud of this unit, as by its means communications have been established over remarkable distances."

One would think that with the connection of the mains power in 1916 the use of the diesel engine would be phased out by driving the 500 cycle alternator supplying the Telefunken transmitter with an electric motor, and retaining the diesel engine to drive a standard voltage and frequency alternator to supply essential power requirements in case the mains power failed. If everything failed there was still the Chapman Pup to use for the transmission of messages in the event of an emergency. Pictures of the machinery installed in the engine room in the 1920's and 1930's seem to confirm this assumption although the dates claimed for when the photographs were taken could well be later. It is not possible to correlate all the items of control equipment on the switchboard with the machinery known to be installed or vice versa without further information.

The article in the West of 1922 went on "Eventually Mr. Trim thinks , when more modern apparatus is installed, all messages between Australia and South Africa will pass through Applecross. He expects that in the near future the station will be equipped with a set of up-to-date 35 kilowatt transmitters , which will make possible a continuous direct traffic with South Africa during daylight."

(The Broadcaster Annual of 1934) "In 1922 the station was taken over by A.W.A. as one of their chain throughout Australia and modernised by the introduction of the then latest type valve transmitter. Five years later this was again superseded by a standard coastal radio service 5 kilowatt transmittter, which consists of a powerful set for ship-shore service tunable from 600 to 2400 metres, an auxiliary low power set operating from 14 to 800 metres and a short wave set of 14 to 60 metres used as a feeder in the beam wireless service.

A report in the "The Radiogram", the A.W.A. Staff Magazine of July 1931 said "In 1922, the station was taken over and modernised by A.W.A. when the 2 k.w. adaptor set valve transmitter was installed. This was superseded in 1927 by the standard C.R.S. transmitter rated at 5 k.w.". Apparently the two 35 k.w. transmitters that Mr. Trim expected to be installed in 1922 were not installed and a 2 k.w. adaptor set valve transmitter installed in lieu.

In the article in the West Australian on July the 22nd 1922 it was reported "there is also in course of construction at Applecross a directive aerial". What this was about is not known. It could have been directed to the Eastern States or it could have been an experimental aerial tied up with A.W.A's. attempts at international linkage.

On the 5th June 1925 the West Australian newspaper reported the introduction of Commonwealth News Bulletins which would be broadcast to shipping. Applecross was one of the three stations to transmit those messages (3 A.M daily on 1,800 metres). The service would commence with the letters CQ and the announcement - Commonwealth Government News Bulletin transmitted by courtesy of Amalgamated Wireless.

In July of 1931, Mr Trim now Superintendant of all of A.W.A's coastal radio stations installed the W.A. Police wireless equipment, call sign VK-I for communicating with the police cars. The transmitter and aerial were located at Applecross. The same transmitter was used for the A.W.A. experimental short wave broadcasting station VK6-ME (Mr. Trigwell).

Following on from the 5 Kw. Coastal service transmitter installed in 1927 the Radiogram went on - "next to be introduced is the auxiliary transmitter, the pride of V.I.P.....25 watts on 600 metres...the Chapman Pup. The Broadcaster referred to this transmitter as follows - "There is also a small auxiliary set driven by a small Chapman "Pup" engine of the type familiar to motor-boat enthusiasts. VIP is very proud of this unit, as by its means communications have been established over remarkable distances".

The Broadcaster Annual of 1934 also referred to "Besides its normal functions, the station is equipped with a very efficient "B" class broadcast transmitter, with an aerial rating of 500 watts, radiating 6PR's programmes. All the apparatus in the station is Australian made." (6PR came on the air on the 14th October 1931 and was started by Nicholson's Ltd. Nicholson's were A.W.A's agents in Western Australia and the equipment was rented from A.W.A.). The 6PR transmitter was located in a separate building alongside the Engine House and which I later refer to as a store for want of a better name.

No detailed references have been sighted as to changes made to the equipment since that time. Mr James who commenced work at Applecross in 1942 as an employee of A.W.A. recalls his first tasks were removing the machinery from the engine house. This was at the same period the architect Mr. Milton Boyce was arranging various works to the building (see later). The engine room then became a transmitter hall. It was now possible to dispense with the rotating machinery and power the transmitters direct from the normal electricity supply. The Fordson auxiliary power generating set was located in the room on the west of the engine room in 1942

and this was shifted to the building vacated by 6PR and VK-6ME. In 1943 the operating staff moved to Bassendean (see below) and returned to Applecross in 1946 and were accommodated along with the receivers in the centre of the transmitter hall, with the transmitters around the periphery. These included the transmitters for 6PR and VK-I which had been transferred from the building alongside. As mentioned above no records have been located relating to the other transmitters. In later years Mr James has said they were juggled around regularly to suit the needs. In the appendices are drawings, not to scale, showing approximate locations of transmitters in 1946 and 1962 or thereabouts. The 1946 equipment is as recalled by Mr. Trigwell who was required to test the transmitters for compliance with the regulations as part of his duties with the Radio Licensing Branch of the P.M.G's Department. The 1962 layout has been prepared from advice by Mr. James and from a photograph taken by Mr. James and one from the O.T.C. Archives.

Returning now to the sequence of events. The Second World War. (O.T.C. broadsheet.) "On the outbreak of war in 1939, normal commercial services with shipping were suspended. All merchant ships observed radio silence except in emergencies to prevent revealing their whereabouts to enemy warships. The coastal stations however, continued doing business as usual but found themselves handling a much greater volume of outgoing traffic. Thousands of messages were transmitted on behalf of the Department of the Navy. etc. A number of stations in the coastal service, including Darwin, participated in the Navy's Coast Watching Scheme, maintaining a listening watch on a specially allocated frequency for reports from volunteer coast watchers in remote places around Australia's vulnerable northern coastline". (From 1943, staff members were accorded the R.A.N.V.R. rank of Warrant Officer or Chief Petty Officer). According to Mr. Norm Odgers the Navy assumed control of Darwin, Port Moresby, and Thursday Island. Applecross remained under the control of A.W.A. This was confirmed by Mr. F. James. The perimeter of the site was regularly patrolled by soldiers during the war. "The Seawatchers" perhaps more precisely says "The immediate consequence for the Coastal and Island Radio Services was that their operations came under the control of the Royal Australian Navy, although A.W.A. retained its ownership and its management role, and staff remained on the A.W.A. payroll. Whether you can have control but not the management is argueable. Mrs June Turner, the step daughter of the Engineer Mr Sid Trim, who resided in the "Village", reports that a Chief Petty Officer and two ratings regularly patrolled the area at the top of the hill and for a period a naval guard was mounted at the gate to the site.

The high frequency beam service to overseas was subject to inherent defects, such as interference from other stations, distortion, fading or even complete loss of signal due to atmospheric effects. These variations caused interruption to services and limiting of the hours during which satisfactory working could be maintained. A partial solution to the

ionospheric variations was found in the use of intermediate relay stations.

Perth's Applecross station, which had operated as a coastal radio station since 1912, took over such a role during the Second World War, its transmitters being paired with receiving equipment of a second Perth station, established in the suburb of Bassendean in 1943. The Perth relay facilities were closed down at the end of the war but were re established by O.T.C. in 1952 to provide an alternative route to Britain during the approaching trough in the sun-spot cycle. (O.T.C. Broadsheets 4 and 5).

An additional benefit of moving to Bassendean according to Mr. Trigwell was to secure communications from attack. The facilities at Bassendean being located in 18 inch thick concrete structures.

The advent of America into the second world war on the side of the allies brought up matters related to the continuance of the Imperial Communications system as it had been, and the future policy for post war years. A series of meetings of the Commonwealth countries was held from 1944 on, culminating in the Chancellor of the Exchequer making a statement to the House of Commons on the 1st of November 1945 that each partner government would take over all external communications in their particular country. In Australia this resulted in the formation of the Overseas Telecommunications Commission which took over the cable operations of Cables and Wireless and the radio communications activities of A.W.A. The Perth Wireless Station as a result came under the control of O.T.C. in 1947. A.W.A. was paid a sum of 1,400,000 pounds for the business (Australia wide) plus a smaller amount for relocating its facilities on the relevant stations which did not form part of the communications business. This would seem to refer to activities like the 6PR transmitter which was relocated to another location in Applecross.

The following account of the subsequent movements of staff has been pieced together from various sources and the details are rather hazy. The substance is correct. The details may vary.

In 1953 O.T.C. moved the wireless receiving station from Applecross to Bassendean, the transmitters remaining at Applecross. The coastal wireless operators went from Applecross to Bassendean. International wireless operators went to the old cable station at Mosman Park, the receiving equipment being at Bassendean. Messages were received on tape. The main international radio traffic was handled by the eastern states and the local station was mainly a feeder station. There were periods of several hours each day when Sydney and Melbourne could not communicate with London. Traffic was then diverted through Perth who could contact London direct or if not then via other links. The transmitters remained at Applecross and there were dedicated Rhombic antennae directed to London, Nairobi, Johannesburg, and Colombo.

The original 394 foot high mast was a prominent landmark in Perth and was replaced by a 46 metre high mast in 1962. At that time it was estimated the cost of repainting the original mast to be 2.000 pounds and it was decided to replace it.

Antennae would have had to be provided over the years to accomodate whatever frequencies it was required to be used and would have mirrored the technology of the time. As with other technical and other aspects of the station, all the information does not seem to be readily available and the sequence needs to be pieced together as best as possible. The reports in the West Australian of 1912 and 1922 have already been included above relating to the mast. The 1922 article made reference to the aerials as follows "From a point on the mast there radiate, like the ribs of a giant umbrellas which the wind has denuded of their covering, twenty four long wave aerials, each equipped with eighteen porcelain insulators. Nearer the earth the mast is hung with Telefunken ship type aerials and cage aerials, for short wave work. There is also in course of construction at Applecross A DIRECTIVE AERIAL mainly for the purpose of finding out from which direction comes the strongest flow of static electricity."

In Appendix 8 there are references to the German stations at Nauen, Uap, the Carolines and New Guinea having umbrella aerials and in the case of the latter three, on masts 120 metres high. It would seem reasonable and consistent that Applecross was originally fitted out with the umbrella aerial as for the other German stations above with the 120 metre high masts. Telefunken was not involved after the start of the first world war and the Telefunken ship type aerials were also presumably installed in the first instance.

The construction report of 2/7/1912 said "Wires being prepared for the shortening of all twenty four long wave aerials. At present 1,000 meter wave aerials are 100 meters long, and when shortened will be 62 meters long so as to reduce capacity. On the 19/4/1912 the construction report said 8 X 600 meter aerials being connected to second landing on mast. On the 24/5/1912 "Four extra 600 meter aerials being made and when erected will make ten 600 meter aerials erected.

In 1931 "The Radiogram" carried the following. "To the uninitiated, the aerial systems are a complexity of wires, but in reality are quite simple. Suspended from the mast head are the four wires spaced at an angle of 90 degrees, comprising the 1800, 2400 metre system for long distance daylight working with ships. On this traffic has been exchanged up to 2400 miles across the Indian Ocean, and across the continent to Gabo, Brisbane, and Townsville. Lower down the mast is the squirrel cage aerial tuned from 600 to 1055 metres and within these limits the greater part of the station work is done. Other aerials consist of the short wave lecher systems, various other receiving, short wave, auxiliary, or emergency systems, and last but not least the police aerial with its young telephone line feeder.

Quite obviously changes had been made between 1922 and 1931 if one is to believe the different reports. In 1922 there were 24 long wave aeralis radiating from a point on the mast. In 1931 there were four long wave aeralis radiating from the mast head for the 1800 and 2400 metre wavelengths. In 1922 there was a cage aerial for short wave work. In 1931 the squirrel cage aerial was tuned from 600 to 1055 metres. That is long wave, not short wave. It is possible they were different aeralis.

The directive aerial that was being installed in 1922 could well have been the four long wave aeralis reported in 1931. The umbrella aerial could well have been discarded at this stage. A.W.A. who were associated with Marconi had just taken over the station and the long wave aeralis were more in keeping with their practice. See appendix 8. At the same time the sensitivity of the receiving equipment would have markedly improved by 1922 with the use of multi stage valve amplification and the directivity of the aeralis may then have been more important than the mass of conductors forming the umbrella. In an article in "The Radiogram of September 1931 Mr. S. Trim mentions that while in Perth installing the Police transmitter new coastal radio aeralis were installed. He also referred to the installation of two hundred yards of lecher fed transmission lines for the connection of the police aeralis. More information on the aeralis would not go amiss.

During the early man on the moon missions before satellite communications, Applecross was used as a link for N.A.S.A. and in 1960 there were two Rhombic antennae for this purpose. A log periodic beam antenna made by the American Collins company (90 feet high with a 90 foot beam) was erected at Applecross in 1962 as part of the N.A.S.A. program. A matching receiving antenna was erected at Bassendean. Various explanations for the use of the log-periodic antenna have been heard. It seems it could have been a general purpose link depending on the circumstances. One reason given was for relaying communications from Tanarive on Madagascar. Another was for contact with a vessel near Madagascar or the Philipines. Another was for use on search and rescue missions. Another for contact with the Coastal Century, a vessel tied in with the space program. Whether any or all are correct is not known. Confirmation of Applecross's use by N.A.S.A. is given in a letter from Menzies to Brand in November 1964, "special communication facilities associated with the space programme have also been installed."

An O.T.C. plan of 1960 shows a total of 22 aeralis at Applecross. these are itemised as follows :-

Number		Number	
1	Mercury, Rhombic Double Tier.	13	6405 Kc/s 1/2 wave
2	Melbourne, Rhombic Single Tier.		vert.
3	London, " " "	14	2056 Kc/s Vert
4	London, " " "		(tunes).
5	Mercury, Rhombic Double Tier.		
	Nairobi using top tier.	15	2182 Kc/s

6	Mawson "Vee".	16	5880 Kc/s Dipole.
7	8 Mc/s Quadrant.	17	8754 Kc/s "
8	12 Mc/s Quadrant.	18	13165.5 Kc/s "
9	17 Mc/s Quadrant.	19	17285.5 Kc/s "
10	Christmas Island, "Vee".	20	6405 Kc/s "
11	M/F 500 Kc/s (Unsyn).	21	6280 Kc/s "
12	M/F 500 Kc/s (unsyn).	22	4434.5 Kc/s "

The 500 Kc/s and the 2182 Kc/s were distress frequencies which were open 24 hours per day. The 8, 12, 17 Mc/s were long distance Coastal. The Rhombics were the normal channel to London. When London was not able to be contacted, Nairobi was the normal relay station. Colombo was only used in emergencies. The other frequencies were used for normal coastal work. Watch was kept on different bands at different times according to a schedule. The 46 metre mast was removed in 1967 along with the 90 foot log periodic and other antennae.

The then Melville Road Board had been interested in the site since 1958 when they received unofficial advice that O.T.C. planned to move out. In 1959 they were offered 13 acres of the total 99 acres for a price of \$80,000, the deal to be finalised when O.T.C. moved in four years time. In 1962 the then President (Mr.R.F.Carroll.) and the Shire Clerk (Mr.J.E.Ellis) went to Canberra to discuss the matter with the Post Master General. It was the intention of the Town of Melville to use the site for a Civic Centre and Administration Building. In 1963 the Melville Council purchased an adjacent area of land for the Civic Centre and made application to the State Government for assistance to acquire the land as a public reserve. A conference between the State and Federal governments was held and the Council was advised that the Wireless Station could only be secured as a reserve if purchased at current valuation or \$2,000,000. When the then Prime Minister Mr. Harold Holt visited Perth he was shown the site and subsequently he directed the site be handed over to the State at a fair valuation and the State agreed to a price of \$600,000. The area was then to be vested in the City Council, the cost to the Council being \$150,000.

There was a period between the time the Commonwealth moved out and the Council took over when the site was vacant and the buildings were considerably vandalised. Jack Sullivan of the V.H.F. group said that when he first saw the buildings all the windows had been smashed and the metal fixtures removed. Various community groups were vying for use of the premises and one of the considerations was to bulldoze the lot down and form a park.

A development plan was prepared for the Council in 1973 by Dr.J.S.Beard the director of King's Park.

Jack Sullivan drafted a letter on behalf of the V.H.F. group (signed by Tom Berg as secretary to the group), to the Melville Council proposing the use of the buildings as a wireless museum. Following a deputation to the Council and discussions with the Council, this was agreed to whereupon

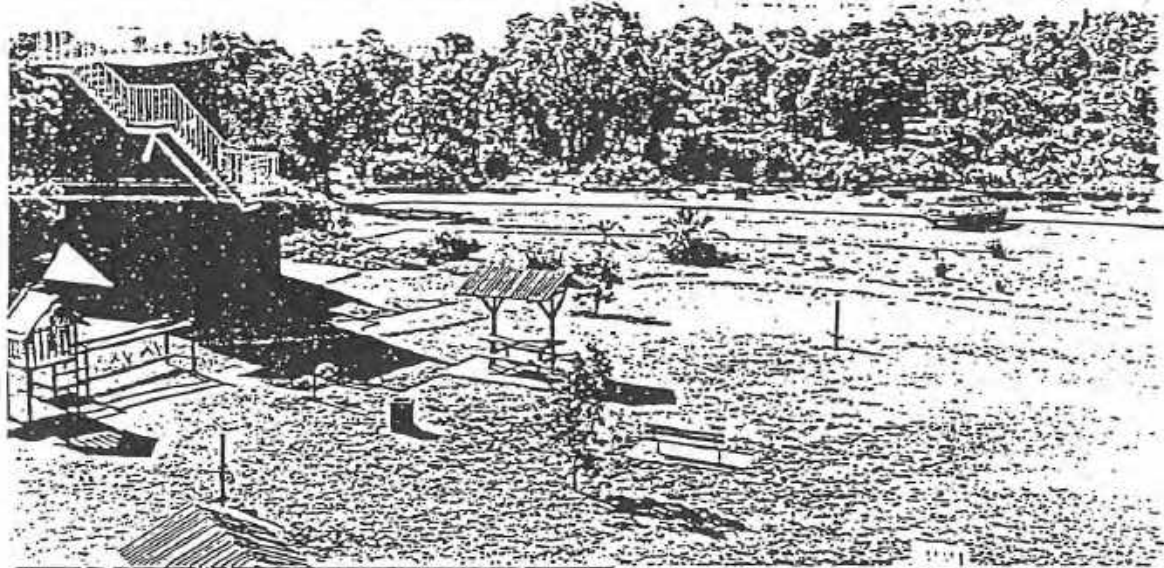
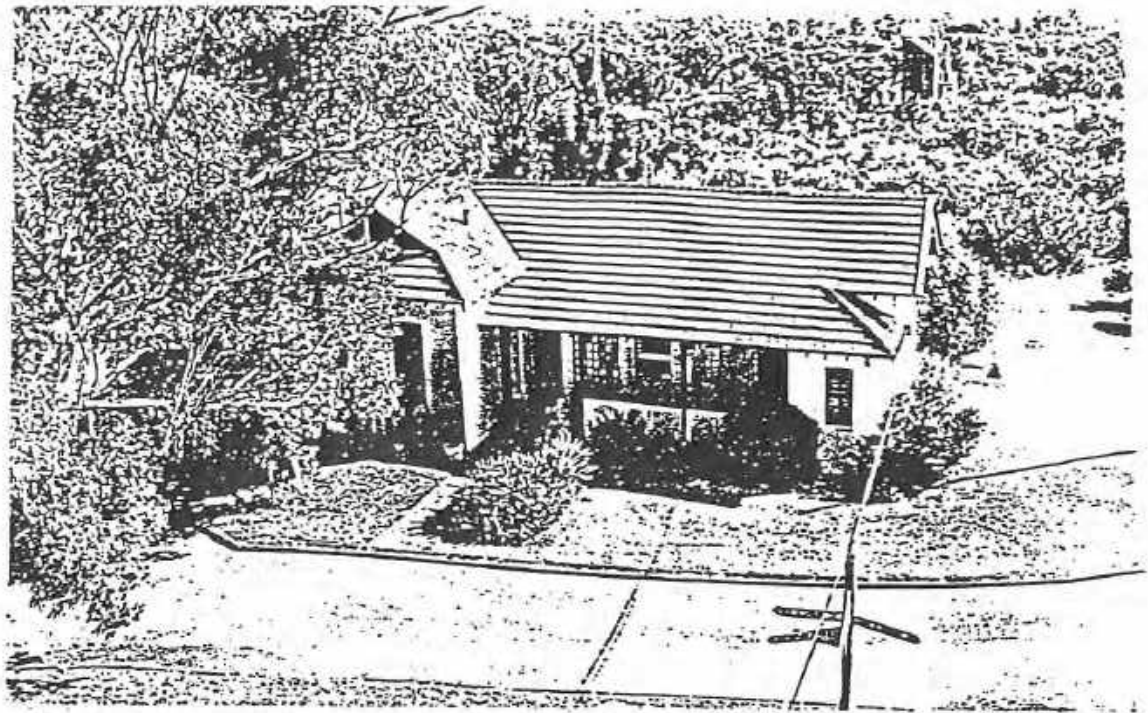


Fig 15. Wireless Hill. c.1990. Top - Operators Building, now caretakers quarters. Middle - Surrounds; on left anchor block of mast, now viewing tower. Bottom - Engine room, now museum. Reproduced by courtesy Wireless Hill Museum. City of Melville. Not to be further reproduced without permission from the City of Melville.

the V.H.F. group proceeded to acquire material for display. Jack Sullivan was the first curator.

The development programme has included public toilets, access roads, car parks, illumination at night, rubbish receptacles and grassed areas. The Operators' building has been converted into the caretaker's residence and the Engine House or transmitter hall into the Wireless Museum. The one time store/6PR/auxiliary power supply building has been considerably extended and now provides space for a meeting room, the district State Emergency Services control centre, and public toilets.

The concrete anchor blocks for the stays to the original 394 foot high mast have been recycled for use as viewing platforms.

While some of these modifications may not have been in the best interest of the preservation of the historic materials, and the overall ambience of the station has changed markedly, the historic associations are so important and enough remains of the premises and surrounds to make this an important site and worthy of preservation for the future.

The village at the foot of the hill comprises three residences and the single mens quarters and is intact and forms part of the reserve. Two residences and the single mens quarters were completed in June of 1912 practically at the end of the construction stage. The third residence was commenced in July of that year. "A City for All Seasons" states "Indeed a small cosmopolitan community rapidly emerged at the foot of the hill, with married couples living in comfortable cottages, and single men in staff quarters". This is in 1911. Also "But the presence of the team which operated and maintained the station ensured the survival of the small village below it, etc". The dates of completion given above are taken from the construction reports and it is hard to envisage their use by construction staff. The single men's quarters are now used for community purposes and also store surplus Council records. The residences are rented out. On an O.T.C. site plan dated 1960, a fifth building was shown slightly apart from the village and fronting the highway. A City of Melville plan refers to it as an S.E.C. sub-station demolished in November 1975. This could have been the site of the transformers installed in 1916. There is no trace left today.

There are three buildings associated with the operations of the station erected on the crest of the hill. These buildings are :- The Operators' House, the Engine House, and the Store. Original plans have not been located and one must be speculative to some extent as to the nomenclature of the buildings and the exact purpose of all the spaces. Superficially from an aerial photograph of Pennant Hills, the design of the buildings appears to be identical with the sister station at Pennant Hills, Sydney, and the design would have had to be performed by the Commonwealth or the contractor. For the record the Pennant Hills station ceased operating in 1957. In one reference the building was subsequently used as a church, and following

the building of a new church as a church hall. "The Seawatchers" on page 198 in contradiction to the above says "The historic Pennant Hills station closed down, at last, in the late 1950's. It was demolished on 17th April 1959." Maybe that is referring to the operators' building as on page 22 it had already said "The building that had been the station's machinery room became the first Church of St Gerard Majella, Carlingford in 1962. With the opening of a new church 10 years later, the parishioners renovated and remodelled the former church to turn it into a parish recreation hall,". The total destruction, or part destruction and recycling that has taken place at Pennant Hills places a greater historic value on Wireless Hill. Milton Boyce a retired Commonwealth Government Architect was transferred from Sydney to Perth in 1938 and supervised various works at Applecross around 1942. He said the buildings at Applecross were identical to those he had worked on at Pennant Hills and he felt at home when visiting Applecross.

The Operators House. This is the terminology used in the construction reports. The West Australian of 1912 referred to the offices for the operators. The Operators' House today is externally basically as it was constructed in 1912. A door has been knocked in at the rear and various openings for the passage of cables have been bricked up. It consisted of three or more rooms in line forming the spine of the building (Original plans of the building have not been located to date). On the eastern side at the southern end of the spine with access off the verandah was a small room which in the 1940's was the office. Along the central section of the East elevation is the verandah, with a store at the northern end of the verandah. The original Telefunken spark transmitter was located in the southern room of the spine. The construction reports refer to this room as the High Tension room. A picture of an identical transmitter at Pennant Hills referred to its being located in the High Tension Room which seems logical. A photograph recently to hand and which one presumes to be part of Applecross but cannot be certain, shows the room adjacent the H.T. room fitted out with a large number of Leyden Jars and inductors and this would be the tuned circuit of the original Telefunken transmitter (See appendix 6-13). At this point of time it is expedient to refer to it as the Tuned Circuit room. The wireless receiver, the switchboard controlling the power to the transmitter, and the operating staff were located in the room at the northern end of the spine. The construction reports of 1912 made reference also to a telephone room and a spare room. Which room was which is not known. In all probability the room at the northern end of the verandah would have to be the telephone room. Why they would have a telephone room at all is problematical. Pictures of 1920's vintage and reports from persons employed at the station in the 1940's indicate the central spine as one big room. The partition walls would have been removed it is thought with the phasing in of valve transmitters in the early 1920's after the article in the West Australian of July 22nd. 1922. In 1922 the West referred to the operating

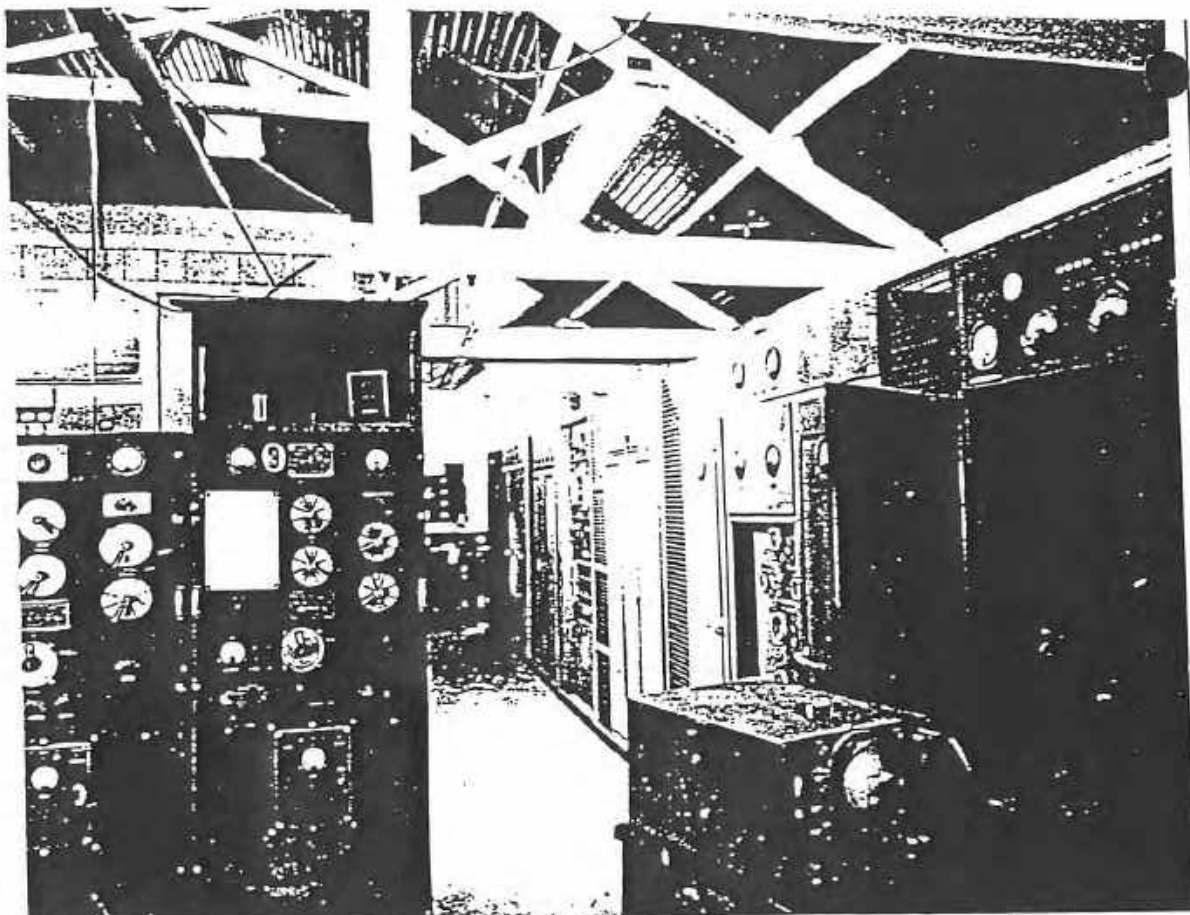


Fig 16. O.T.C. PH/000929. Transmitting Hall. date unknown. Reproduced by kind permission of the copyright owner Telstra (O.T.C.Australia). Not to be in any way further reproduced without the written consent of Telstra.

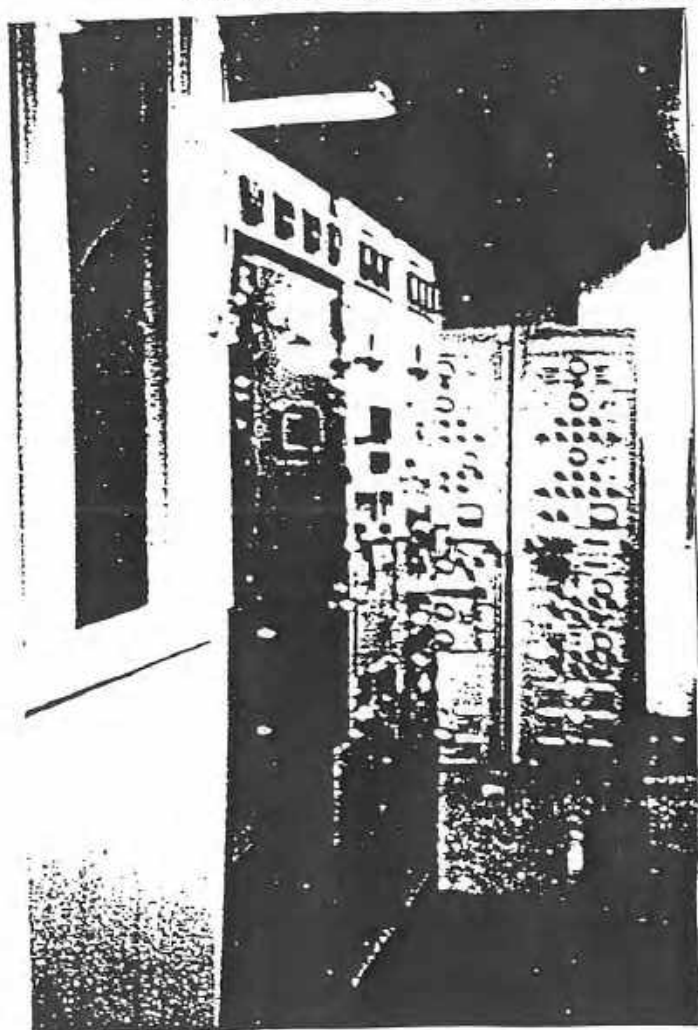


Fig 17. Transmitting Hall 1967. Courtesy Mr. F. James.

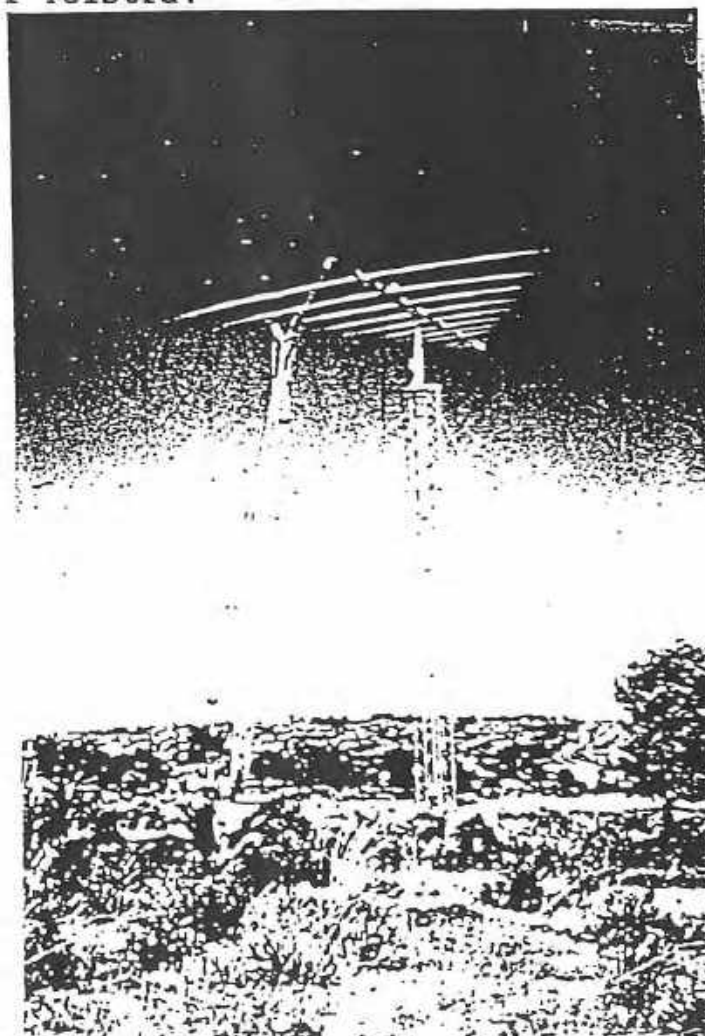
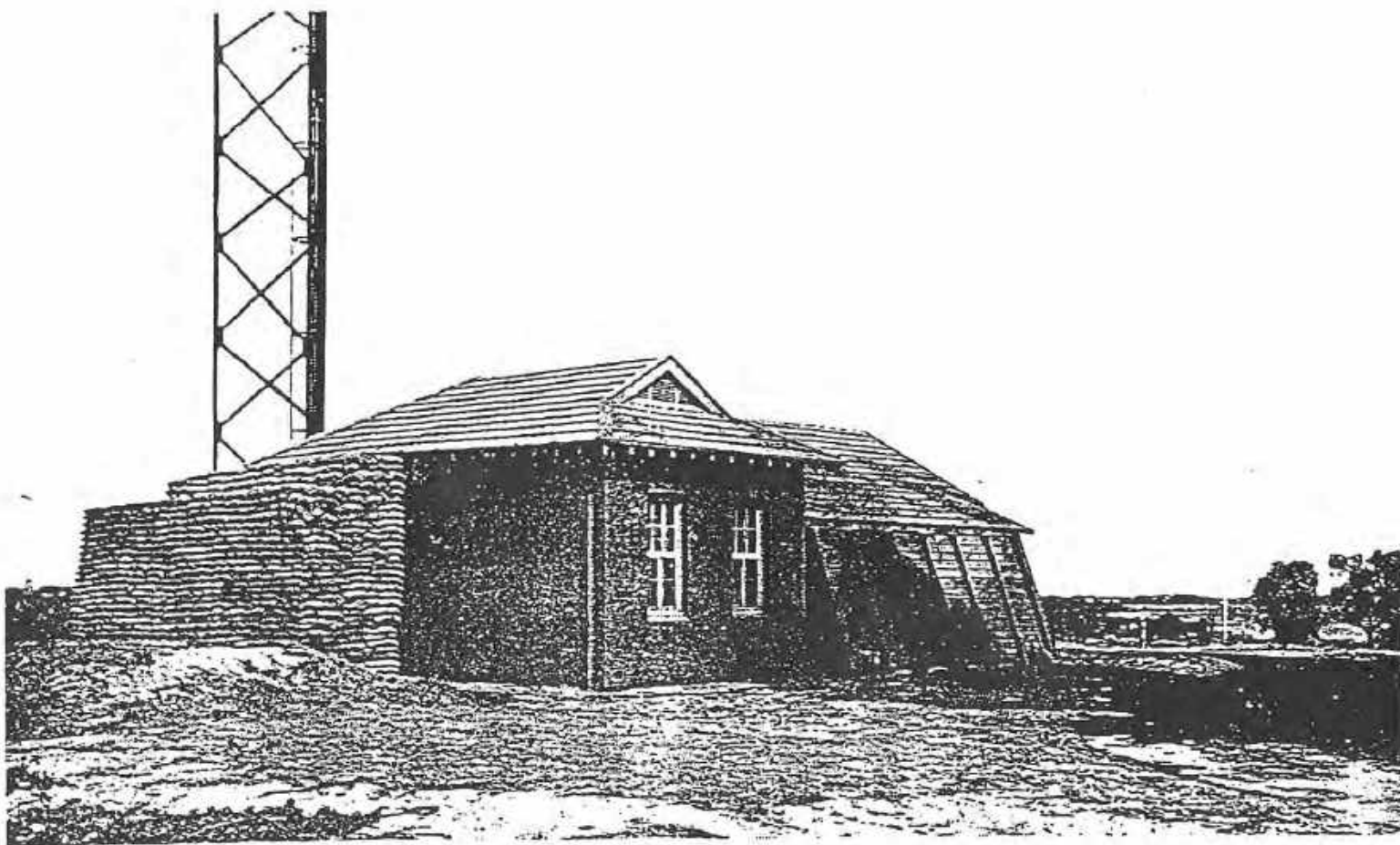


Fig 18. Removal Log Periodic Aerial. Courtesy Mr. F. James.



Radio Perth. Close-up of operating building showing sand-bag and bund protection.

Fig 19. From A.W.A. and the War. A.W.A. 1945. Reproduced courtesy of A.W.A.

room and the receiving room. A later picture shows the whole space opened out. A 1934 picture in the Broadcaster shows the same space filled with a telephone switchboard, generator controls, receivers, large valve transmitters, and other sundry equipment, and with stand off insulators fixed to the underside of the ceiling providing supports for 3/8 or 1/2 inch circular conductors joining various pieces of equipment.

The operators moved out in 1943 when a receiving station was set up at Bassendean. They moved back to Applecross in 1946 and were then located in the Transmitter Hall, the ex Engine House. The Operators' House then became the office. At some stage the small original office off the end of the operations room was converted into a shower and toilet. The building was converted in 1972 for use as a residence for the caretaker when the whole of the stem was subdivided again into three with light weight partitioning. The original tongue and groove timber ceiling remains. The exterior of the building has been rendered all over and painted cream. A light weight metal carport has been added to the southern end of the building and a fence erected at the rear on the western side, between the building and the remains of the foundation for the mast. A picture in "Seawatchers" shows the building in 1942 during the war years and at that stage it was in its original state with red face brick walls, barrackaded behind sandbags, and looking decidedly primitive.

The Engine House is the largest of the three and has had two small additions which do not materially affect the main structure and could be removed at any time. (The toilet at the north east corner is of brick and has been in existence for at least 50 years. The second addition involved filling in the porch with a fibrous cement structure of more recent times, and is not of historic content or sympathetic to the main building.)

It is the most impressive of the three and originally had three rooms. It has a concrete floor with channels or trenches cast in for the provision of services to the machinery originally located in the building. Presumably they also provided a degree of flexibility in accomodating the changes of equipment over the years. Johnston in his memoirs refers to a 12 inch leather transmission belt in the belt channel. A pit can also be seen below the switch board in photographs of 1921 vintage. The whole lot is carpeted today and it is not readily possible to determine the extent of the channels from a visual inspection. It would appear that some have been fitted with timber covers beneath the carpet and that some may have been filled in. There are three internal roof trusses supporting the roof which incorporates a longitudinal celestory roof light. The three rooms have tongue and groove timber ceilings on the rake. The interior has been extensively redecorated and has lost the industrial look in pictures of the 1920's and 30's. In an internal picture of 1912 the Gardner engine was located centrally along the west wall in the main area. The exhausts from the engines passed through the roof on the western side

of the building. A number of tanks were located adjacent the building near the position of the exhaust presumably for the cooling of the engine. The construction reports make reference to circulating water tank stands for the engine being completed.

Reference is made in the index to the Commonwealth Archives to a battery room. This would be the room which ran along the rear of the building and having three 150 mm. or larger diameter ventilators passing through the roof and terminating about 1 metre above the roof level. Mr. James recalls removing the lead floor from this room during his period of service at Applecross (1942-1946). At that time the room was full of junk including incidentally a switchboard approximately 2 metres high by one metre wide formerly in the operating room. Whether this was the twin panel switchboard referred to earlier or another is not known. There are two large metal louvred apertures either side of the external entrance door to this room, presumably also dating from the origins of the building and facilitating ventilation of the battery room.

The third room is located along the side of the building nearest to the operators' building. In a construction report it is referred to as a store. Mr. James' advice is that in 1942 the Fordson auxiliary electric generating set was housed there, that is prior to being shifted to the store (see below).

While the building has been called the Engine House in deference to its original calling, all the rotating machinery was removed in 1942 and the main space was used as a transmitter hall. With the advance of technology presumably, the rotating machinery was no longer required to support the transmitters and the space could be used to better effect. Whereas previously the feeds to the aerials would have originated at the transmitters in the operators' building, they would now originate from the transmitters in the transmitter hall. There are remaining a considerable number of porcelain insulated through connectors passing through the walls for the aerial connections. When the building was renovated for the museum in 1980, sundry other porcelain stand off insulators were removed from the ceiling structure.

In 1946, the operators who had been shifted to Bassendean in 1943, returned to Applecross and were accommodated along with the receivers in a cubicle in the centre of the transmitting hall.

In 1952 the operators moved to Bassendean and to the Cable Station at Mosman Park, and Applecross remained as a transmitting site only, until it was closed in 1967.

The Engine House is presently used as a Telecommunications Museum. There is a small directional short wave antenna hard against the northern elevation of the building for use with a communications receiver in the museum. This possibly could offend the historical integrity and could be repositioned away from the building if deemed necessary.

The third building has been referred to previously as a store for want of a better name. One must speculate as to its original purpose failing anything better.

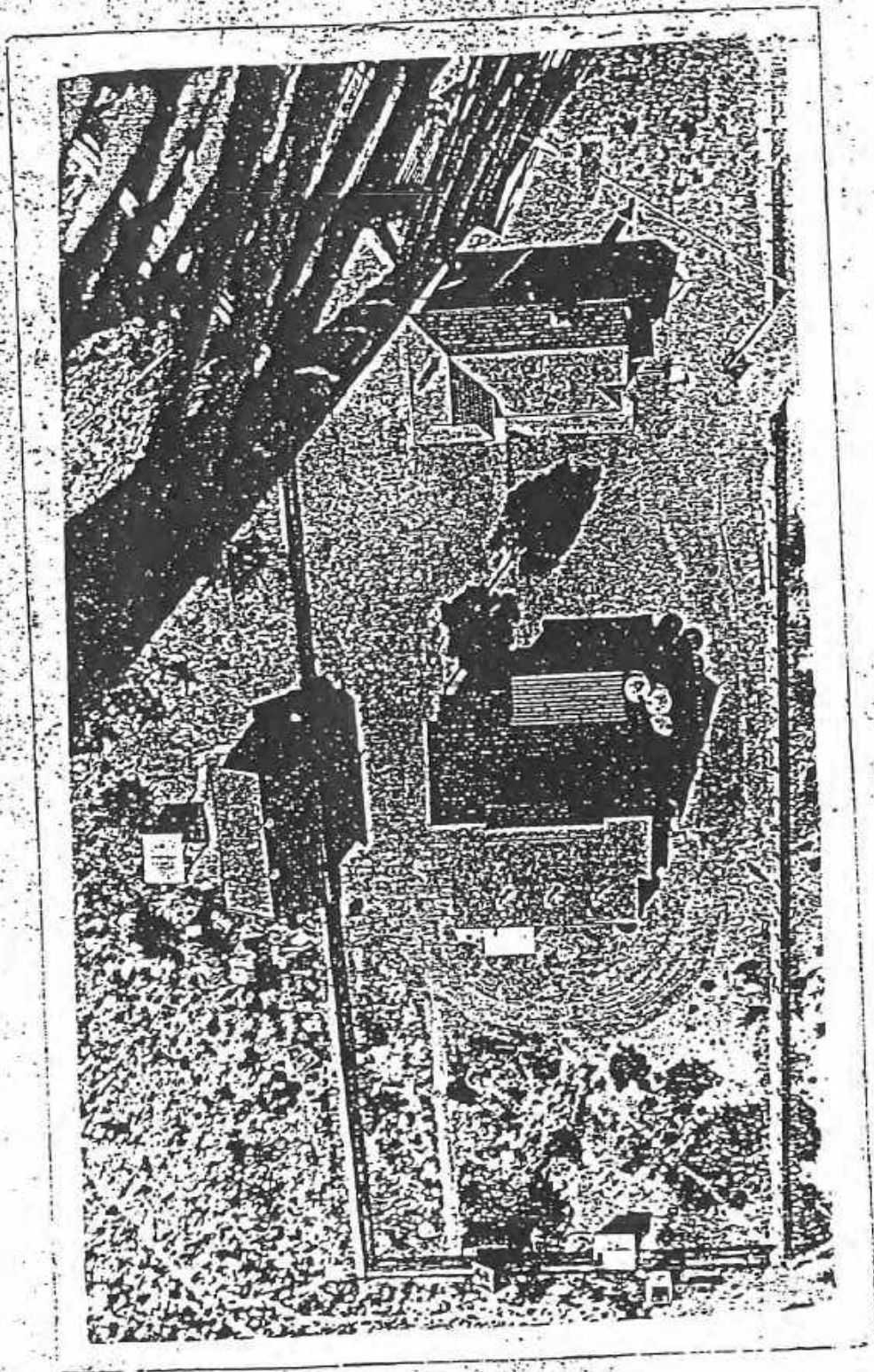


Fig 20. View looking directly down from the mast showing the engine room, operators building, third building, stables, toilet etc. c 1920.
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It would seem that it was built at a later date than the Engine House and the Operator's House. It was not mentioned in the construction reports of the station in 1912. It was not mentioned in the article in the West Australian in 1912. It was not mentioned in the Annual Report of the Architectural division of the P.W.D. in 1911. It does appear in a photograph taken from up the mast in c.1920. The photograph shows that the building was built with one wall in line with the picket fence surrounding the site and with the building built outside the fence. This would seem to be significant in that it would not fit inside the fence and had to be positioned outside for convenience. The fence no longer remains. A study of the documents held by the Commonwealth Archives in Victoria may hopefully provide some clarity.

There are two ventilators rising through the roof similar to those in the roof of the battery room. It must have been intended therefore to house or store corrosive or volatile or obnoxious substances. When the station first commenced operations the diesel engine was required to operate either continuously or intermittently 24 hours per day and would have used a considerable amount of fuel. In August of 1912 there were 960 gallons of kerosene in tins on hand. This would have been stored in the main Engine House. One can see no other provision for the storage of fuel on the site. When electrical power was connected in 1916 the kerosene would have been in the way in the Engine Room particularly as it would only be required in an emergency and it would seem to be good practice to store it in a separate building away from the main operations.

In the same photograph taken from above in c.1920 there could be evidence of an exhaust or other pipe protruding through the roof of the store giving indication of another engine but there is no other evidence to go on and this is speculation only.

Mr James' advice is to the effect that the building housed 6PR and VK-6ME (VK-6ME was also VK-I the Police transmitter. VK-6ME was a short wave experimental broadcasting station run by A.W.A. which closed down at the start of the Second World War). 6PR commenced in October 1931 and VK-6ME in July 1931. This fits in with an article by Mr. Trim in The Radiogram of September 1931 where he installed the Police Transmitter in a separate building to the other transmitters, 6PR came later. The 6PR and VK-I transmitters were shifted into the main transmitter hall in about 1942 and 6PR at least remained there until O.T.C. took over in 1947. The use by 6PR has been confirmed by George Moss and Jack Gabbertas, two ex Nicholson's employees.

From about 1942 the building housed the auxiliary power supply for the station. In the initial instance the Fordson powered unit was transferred from the engine house and later a replacement Blackstone unit was installed.

Since being taken over by the City of Melville the building has been extensively modified in being extended in 1980 to approximately twice its original size as well as external public toilet facilities being added to the south. Because of its use in the life of the wireless station and if it was not there some atmosphere would disappear, it is still

considered to be worthy of preservation despite its considerable alterations. It is presently used as a meeting room and the extended portion used by the State Emergency Services as a command post in the event of emergencies. As part of the S.E.S's role, small communications antennae are attached to the fascia. In the rear wall of the meeting room are two rectangular and one circular apertures presumably remaining from the use of the room for the emergency plant. The original room has been ceiled with plaster or fibrous cement sheets with timber battens.

There is a small brick toilet block to the east of the three main buildings presumably dating from the commencement of the station, which one would have referred to at the time as being located down the yard, that is when the fence was in place. It can be seen in the photograph of c.1920 from up the mast. It is not in use and would have consisted of a single toilet and an adjacent cubicle for washing of the hands. Norm Odgers has confirmed it was not in use in 1942. The conveniences at that time being the small addition at the north west corner of the engine house.

In the computer index to the Commonwealth Archives reference is made to a buggy shed and stables. In the same picture of the 1920's mentioned above there seems to be evidence of a stock yard with an open sided shed alongside to the east of the store. This would have to be the stables. There is also an addition of sorts showing at the rear of the engine house and this has been confirmed by Mr. James as a "lean to" used for the parking of vehicles. Whether this would be the buggy shed referred to in the index is not known. Against this assumption one cannot see evidence of gravel up to the shed in the overhead picture or evidence of wheel marks. There does not appear to be any other possibility. No remains are evident at this date.

Mr. James has also referred to an air raid shelter constructed during the second world war, which was located towards the south east of the operators' building and south west of the store. No trace remains.

The buildings are well constructed and maintained. Additions apart from the fibrous cement addition to the engine house have been carried out in sympathy with the existing. All the buildings had red face (pressed) brick cavity walls with tiled roofs. The operators' building has been rendered subsequently to 1942 and painted cream, while the other two buildings have been painted white externally. It is reported the original tiles were of the Marseille type and were replaced and this could have been done in 1942 while other repairs were being carried out under the direction of the Works and Housing architect Mr. Milton Boyce. Photographs of the operators building in 1912 and 1945 reveal the removal of the finials to the gables in the intervening period which lends support to this report. Windows in the main are original and are of the vertical counterbalanced multi pane sash type. Internally all the

buildings have been painted or modified and have lost their original industrial flavour.

Also remaining on the site from the original station are the three concrete anchor blocks for anchoring the guys to the tower and the central concrete foundation for the original three hundred and ninety four foot high mast. The central foundation originally had three legs pointing upwards and each leg appeared in a photograph taken during World War 1 to be about 1.5 to 1.8 metres high. One of the legs has been removed and the other two seem to be reduced in height. It was thought that this could have been a replacement base for the 46 metre mast erected in 1962, however advice is that the replacement mast was erected a short distance away. It is understood that when the mast was being demolished the one leg of the base was removed in order that the tower could fall unhindered in that direction. The foundation is not readily apparent in that it is not that big and is hemmed in by the fibro fence at the rear of the caretaker's quarters and by a radio mast and control cubicle for two way radio facilities for the City and other users.

The large concrete anchor blocks have been recycled for use as look out towers. These have had a brick pedestal with a concrete landing built along one side and with a wrought iron staircase fixed around their periphery. Overall they have been painted green.

Apart from the original mast there were various other antennae distributed over the whole site as the need arose. Reference has already been made to the aerials existing in 1960. A check where two of the legs of a rhombic antenna had been located revealed at each location a small concrete mounting base, and presumably these exist over the whole site.

At the foot of the hill on the reserve are three brick and tile dwellings and the single men's quarters ("the village"). The dwellings are used as residences, and the single men's quarters is used by community groups and for storage by the City. The article in the West Australian of 1912 talked about two dwellings and a single men's quarters. The dwelling nearest the highway appears to have been built subsequently. It is basically of the same construction as the others however there is more detail to the gables, the verandah posts are turned, and the detail to the chimney top is different. The construction reports make reference to the completion of two residences and the single mens quarters in July of 1912 and the commencement of a third residence in July of that year.

The single men's quarters is now used by the veteran car club and the embroidery club as meeting rooms, and some rooms are used for Council storage. The single men's quarters have an interesting layout and would seem to have been ideal for the purpose. The building has a verandah practically all the way around and all private rooms face onto the verandah with no internal access. There is a large

common room with entries to the front and rear verandah and to the entry hall. The hallway has plain face brick walls, and quarter round skirtings. Other skirtings are approx 225 mm timber of moulded section. Walls apart from the entry are finished plaster. All ceilings are plain plaster. The floors are timber apart from the verandah at the rear which has a concrete floor.

All the buildings are of brick. The foundations would appear to be of brick with a stucco finish. Verandah handrails are of timber with a plain top rail and timber posts supporting the roof. These supports vary from residence to residence. The single men's quarters are of square section, the lower residence has turned supports and the remaining two residences have large tapering sections (200 mm approx. at base). Whether they were short of heavy timber or whether they have since rotted, some of the tapered members have lapped joints in their length fixed together with a dowel. Mr. Milton Boyce a retired Architect from the Commonwealth Department of Works and Housing recalls that he replaced the verandah on the top residence (that of the manager Mr Chapman) in 1942 and one of the old columns was presented to him and he incorporated it in his own residence. He could not recall regarding the joints. Chimneys have a stucco finish with a rendered feature at the top. The interior of the houses have not been inspected. Each of the houses has had minor additions. Mrs Turner the step daughter of Sid Trim has reported that they lived in the second house from the bottom and that the extension room at the front was built for her. Mr Chapman, the manager of the station lived in the bottom residence.

The West Australian in 1912 mentioned that the whole block was to be enclosed with a six ft. picket fence with large entrance gates from the Fremantle road. This is not quite right. The construction reports indicate that the Engine House and Operators House were enclosed with a five foot half picket fence, the anchor blocks were to be fully picket fenced and the whole site was to be enclosed by a six foot barbed wire fence. Mrs June Turner the step daughter of Sid. Trim, a Commonwealth and later an A.W.A. employee on the site, recalls the whole site being enclosed by a wire fence during the period of the second world war. All fences have been removed at this stage.

In the same category Mrs Turner has said that as children they were not allowed to roam over the site due to the existence of a crumbling well. No evidence of the well exists today. In the picture from up the mast in 1920 one can see what could be the well not far from the toilets at the rear of the picket fenced area.

The National Trust in August of 1992 classified the whole site including the buildings which means that in their opinion the site and buildings are of heritage significance.



Appendix 1.

Sources of known Photographs, Perth Wireless Station.

Commonwealth Archives, Perth.

Photographs of the Applecross site prior to the decision to erect the Wireless Station. November 1910.

"The Radiogram, July 1931."

Dahlia Bloom.
The Police Transmitter.
Short Wave Oscillator Panel.
V.I.P. Mast and Station Buildings.
The Quarters.
Como Jetty, near Wireless Station.
Generating Units and Switchboards.

"A City for All Seasons."

Installing the diesel powered generator at Wireless Hill 1912.
Members of the Military Detachment, World War 1.
Applecross Wireless Station in its Setting, circa 1935.
Wireless Hill Museum. Date not given.

"Wireless Hill Museum."

View from up the Mast. No date.
Group of Men at Base of Mast. Presumably construction personnel.
Looking Up the Mast.
Looking Down the Mast.
Spark Transmitter in Engine Room. No date.
Spark Transmitter ditto. Different view.
Operators Room 1912. Close up view of Switchboard and Wireless Receiver.

"Battye Library."

Sailors Scrubbing Verandahs of Quarters, circa 1916.
Sailors who worked the station, circa 1916.
Mr. Wolfe who was an operator for a period of time, circa 1920.
Applecross Telegraph Building, circa 1920.
Sentries that Guarded Applecross, circa 1916.
Village, circa 1916.
Operators in Operators Room, circa 1916.
Diesel engine, 1912.

Western Mail, 1912.

A General View of the Mast.
Operator's Room.
A closer view of the Mast.
Operator's Building.
Anchorage for Steel Guy.
Base of the Mast.
The Engine room.

"Broadcasters Annual 1934."

The Wireless Mast at Applecross.
The camera looks down the Mast.
The base of the Mast.
In the main control room.
The three Telefunken units by which radio communication was established early in the 20th century.

"O.T.C. Archives."

PH/000929 Transmitting/Receiving Equipment, date unknown.
PH/000930 Control Switchboards, 1921.
PH/000931 Switchboards with Generator in foreground, 1921.
PH/000932 20 Kva. and 60 Kva. generators located in the back room and used to power the transmitters, 1921.
PH/001157 Operator's Desk, date unknown.
PH/001341 Engine Room, 1915. The date is obviously wrong as the machinery shown powered the C.R.S. transmitters which were not installed until the late 1920's.

"Seawatchers" Page 26. While credited to A.W.A., the picture is identical to O.T.C. photograph PH/001157.

"Seawatchers" Page 21. The original Perth Radio Station at Applecross soon after it began operating in 1912. City of Melville. (In this photograph the guys to the mast are visible and may be clearer on the original.)

Page 83. The Operating Building, Perth Radio, in wartime. Note the sand bags and the protective timber structure. From A.W.A. and the War. 1945.

Fred James.

A series of colour slides showing the removal of the Log Periodic Antennae, 1967.
Slides of the gantries used to route the antennae feed cables around the site.
Slides of the transmitting hall, 1967.

Commonwealth Archives.

Commonwealth Year Book. No. 37. O.T.C. Act of 1946.
External Radio Services operated by A.W.A Ltd.

Records relating to the Perth Wireless Station held by the
Commonwealth Archives in Victoria.

38 items. Cannot be accessed from Perth. A quote could be
obtained for copies.

Perth Auto Starter.

Perth Accumulators 1915 - 16 MP 341/1 Vic.

Wireless Perth Station.

1915. Wireless Perth. Engine pumps. Vic.
1913.

1912-1913. Wireless Perth payments.

1914. Laying of gravel in front of buggy shed and stables.

1913-1914. Supply of wire gauze doors and screens for
operating houses and quarters.

1914. Kalsomining of the walls and repaint of the woodwork
at the residences and quarters.

1914. Repairs to Battery room floor.

1914. Electrical equipment. New engine.

1911-15. Wireless Station. Perth Quarters.

1914. Wireless accounts. Sydney Trim. W.S.Perth.

1913. Travel expenses.

1914. Wireless Perth Station.

1914-1915. Wireless Station Perth Quarters.

1914. Wireless Perth.

1912-1914. Wireless Perth.

1912-1914. Buggy shed and Stables.

1912-1913. Wireless Perth. Telegraph line.

1913. Wireless Perth Station.

1924-24. Applecross Wireless Station. Renovations and
repairs.

1914-22. Perth Water Supply.

1935. Chief Inspector Wireless. Report on visit to Perth.

1934. Wireless Branch Staff Perth.

1916. Wireless Staff. Rent to be charged to relieving engine
operator, Perth.

1919. Perth/Broome wireless proposed.

Records relating to the Perth Wireless Station held by the Commonwealth Archives, Perth. Extracted by John Moynihan.

- 1912. Fremantle Wireless Station. Leads installed below floor level to be enclosed in conduit otherwise leads to be above floor.
- 1912. Wireless Station. Contractor asking for supply of 30 Galvanised Stayplates, etc.
- 1912. Wireless Station. Contractor asks that Telegraph Poles to be used, be inspected at the Mill.
- 1910-12. Expend for Advert. Call for Tenders for Wireless Telegraph St. to be charged to Additions-New works, etc.-Wire Tele Fre Stol.
- 1912. Fremantle Wireless Station. Inspection of.
- 1911-12. Wireless Station. re alteration in accomocation of Officers Quarters.
- 1911-12. Fremantle Wireless Station. Reports re Inspection of progress of Work.
- 1912-13. Wireless Station. Re supply of a Typewriter and Office furniture.
- 1912-13. Wireless Station. Requisitions for Stores and Office Requisites.
- 1912-13. Tenders. Supply Kerosene Oil at Fremantle Wireless Station.
- 1912-16. Information on Ships Positions. Telephone from Wireless Stations.

Perth Wireless Station. 8/9/1992.
Precis of Material at Commonwealth Archives, Perth.

File. 1915/16.

Information on ships positions. Telephone from Wireless Station.

Deals with regulations, Statutory rule 1912/12, re method of conveying details of ships positions to owners. Letter as to how owners are charged for telephone calls. Letter re Naval Department being debited with respect to calls. Now responsibility of Naval Department to charge owners.

File 1482/12.

Expenditure for Advertising, Call for tenders for Wireless Telegraph Station, to be charge to additions, new works etc. Bottom folios.

13/9/1910. From Electricians Branch G.P.O. Perth to Deputy Post Master General.

Nine sites have been inspected numbered below from A to I. All except B are within 5 miles of the Fremantle Post Office.

Captain Cresswell inspected personally A, B, C, and D. The lot were inspected by Lieutenant Snee R.N., Mr Moens, and the Electrical Engineer. Mr Moens was the representative of the Australian Wireless Company.

Mr. Moens advised that the site would need to be 500 yards by 500 yards, equal to about 52 acres if away from the coast or half that size if near the sea.

The area on the North side of the Swan River within the 5 mile limit or any position on the sea front is not considered suitable from a defence viewpoint.

(A). Point Walter. Height 248 feet. Land is expensive, about 100 pounds per acre. Land forms part of a reserve and there would no doubt be opposition in taking land from a reserve.

(B). South Perth. 8.9 miles from Fremantle. Height 110 feet. Not suitable according to Mr. Moens due to obstruction by Mt. Eliza (230 feet.). Mt. Eliza bears a N.N.W. direction and is in the direction of vessels approaching from Colombo.

Captain Cresswell thinks best from a defence point of view.

(C). Lucky Bay. Height 160 feet. A good site. Plateau at top gently sloping away. Satisfactory from a defence point of view.

(D). Canning Road near Attadale. Height 140 feet. 3 1/2 miles from Fremantle. A fair site.

(E). Corner South Street and Carrington Street. Fine commanding site. 180 foot elevation but would be an expensive one. Unsuitable as rocky ground.

(F). Fremantle commonage. South Street. 140 foot elevation. Good land and a very fair position.

(G). Municipal endowment land, Fremantle. Elevation 80 foot. Not as suitable as (F).

(H). On sea shore south of Fremantle. Mr Moens advises best for a wireless Station.

(I). Municipal land Forrest Road, Fremantle. Elevation 155 feet. A favorable site.

The sites in order of preference by Captain Cresswell and Mr. Moens are -

	Cresswell.	Moens.
1.	B	H
2.	C	Cottesloe, 3-5 miles Ftle.
3.	D	A
4.	F	C
5.	A	I
		F

Shore sites not considered suitable by defence authorities.

Site A. A fine one. Costly and resumption difficulties.

Site C. Less cost.

Moens - Removing the station from the shore to site A will reduce the range from 1,250 miles to 1,000 miles. In case of other inland sites will reduce range to 900 miles.

Any of the proposed inland sites will require the use of a counterpoise on account of the dry soil in summer time.

Settled districts are in the vicinity of most of the places referred to. The farthest removed would be perhaps 2 miles. Telegraph lines exist within a short distance of any of the sites named. Site C for instance would be within 2 miles of an existing line of poles.

Like to hear as soon as possible which site is preferred as it will be necessary to photograph.

D.P.M.G. to Melbourne. Report of Electrical Engineer re selection of site.

Melbourne. Telegram. Please obtain and post earliest possible photographs of site C.

23/11/1910. Please advise by wire nearest point to site at which public gas is available. Chiefelec.

23/11/1910. Nearest point to C, East Fremantle distant 3 1/3 miles.

24/11/1910. Please advise nearest point electrical supply available and estimated cost of extending mains to site C.

Also voltage and nature of supply. Chiefelec.

26/11/1910. To Chief Electrical Engineer, Melbourne. Nearest point Fremantle Municipal Boundary distant 3 miles. 2,200 volts alternating. Estimated cost for two phase 30 hp. motor including 2 X 15 Kw. transformers - 584 pounds. Supply Company Schedule rates to boundary plus interest and depreciation amount to about 10 % on construction cost beyond boundary. Company stipulate contract must be made definite.

28/11/1910. Chief Electrical Engineer to Electrical Engineer, Perth.

How would terms be amended if 60 hp. required. What are the scheduled rates for power. For what period would Company require contract. Query re 10 % on construction cost or do Company require guarantee on consumption.

30/11/1910. Electrical Engineer, Perth to Chief E.E. Melbourne.

Manager of Tram and Power Board states error.

3 miles, 2 phase, 30 hp. 784 pounds.

60 hp. 1,095 pounds.

Contract for period not required if P.M.G. willing to remove line, otherwise 10 year guarantee or other provision.
 23/12/1910. Telegram from the Secretary, Dept of Home Affairs. Minister desires you wait immediately on the Minister for Lands for immediate survey.
 23/12/1910. Mr Johnston the Surveyor General has arranged for a surveyor to proceed from Perth 9 A.M. tomorrow.
 29/11/1910. Photographs forwarded. Letter of advice with a description of the photographs.
 24/12/1910. Mr. Wilson said that Colonel Irvine would like to accompany the Minister on tuesday when he visits the site.
 22/12/1910. Report to the D.P.M.G. by the Electrical Engineer, Mr Dirks. Mr Farrel the surveyor has not yet submitted any plan. Enquiries are being made as to what he is doing.
 13/1/1912. Warrant Authority No. 498 of 1910/11 for expenditure of 3,325 pounds for the establishment of a Wireless Telegraph Station at Fremantle, W.A.
 1/3/1911. Commonwealth Works Registrar for W.A. If available the Company wishes about 50 trees suitable telegraph poles to be left on site for their use.
 3/3/1911. No trees suitable.
 13/5/1911. To the Hon. Act. Premier. from D.P.M.G. One litho plan received. Would like another one.
 4/7/1911 ditto. to be expedited if possible.

This is the back of file No 2 so we go back in time a bit.
 21/10/1909. Advertisement for Wireless Telegraph Station. On file. Specification No. 330. Form of Tender and Commonwealth General Conditions. for the installation at Fremantle.
 Alternative prices were sought for a range of 500, 750, and 1,000 nautical miles.
 10/1/1910. Add - preference will be given to a system which emits a distinct musical note. Extension of tender closing date from 22/2 to 1/3/1910.
 4/4/1910.
 Secretary P.M.G's. Dept to D.P.M.G. The Post Master General has approved the tender of Australian Wireless Limited for the installation of a Wireless Telegraph Station at Fremantle having a range of 1,250 nautical miles at a cost of 4,150 pounds. Completion 52 weeks from notification which is now going out.
 12/8/1910. Chief Electrical Engineer to Electrical Engineer, Perth. Notes for guidance on the selection of a suitable site.
 1. Determining factor. Suitability for defence.
 2. P.M.G's. Dept. concerned on the effect of selection rather than in controlling the selection.
 3. If P.M.G's. objection to the site should be clearly made known to Captain Cresswell at the time and reported to this office.
 4.(a). Ease of access. Prefer not far from a railway but at least access by a good road.
 (b). Near a settled township. (no difficulty in obtaining suitable residences for staff).
 (c). Near an existing telegraph line.

5. Suitable from a wireless point of view by the engineer for the contractors, but his objections should be stated specifically and fully weighed in light of local conditions.

6. The engineer for the contractors is to indicate the effect of the site on his equipment.

7. Any amendments to the contract are to be dealt with by the Central Office.

8. The points to which the engineer for the contractors will direct specific interest are -

- (a). facility for obtaining a good earth.
- (b). area free from trees.

9. If the engineer for the Company considers the site selected will need use of a counterpoise, this point should be specially investigated. If at all possible a direct earth should be retained. If a counterpoise is used it will be necessary to see site free from unwanted trespassers, in certain circumstances it may be dangerous to life. If counterpoise is used site will require to be properly fenced.

16/8/1910. The Electrical Engineer is to liase with Captain Cresswell, Director of Commonwealth Naval Forces. Australian Wireless Limited have been asked to have a representative to accompany Captain Cresswell. Capt. to leave Melbourne by rail 25/8/1910. Join Otway at Adelaide en route to Fremantle.

24/2/1911. Advertising. Call for tenders for the installation of Wireless Telegraphy . Perhaps this is for other stations and not Applecross.

25/3/1911. Works Director requests payment for the clearing of the site.

5/4/1911. Act. Sec. P.M.G. Melbourne to D.P.M.G. the Post Master General has decided the name Fremantle be adopted as the name for the station in question.

24/4/1911. Note. The question may be raised how the Fremantle Telegraph Office will be discriminated from the Fremantle Wireless Station.

19/5/1911. To D.P.M.G. I consider there should be a distinction between the two stations. Manager Telegraphs.

30/5/1911. D.P.M.G. to Sec. P.M.G. Manager Telegraphs suggested "Fremantle Radio" to distinguish between the two.

15/6/1911. A/Sec. to D.P.M.G. No possibility of confusion.

13/7/1911. Vouchers from P.W.D. to Accountant Post Department for payment.

Greenmount Quarrying Co.
Millars.
McLean's.
Rhodes H.
Sandovers.

3/8/1911. James Spiers 100 pounds.

31/7/1911. Cardup Brick Co.
Makutz Brothers.
Power Brothers.

16/9/1911.
Request from the D.P.M.G. to Premier for a copy of the plan of the Wireless Telegraph Station site.
Tracing on file forwarded 4/11/11. (Not too brilliant drawing.)

West Australian 24/1/1912. Re appointments to Wireless Stations including Tilney as Officer in Charge Fremantle Wireless Station.
West Australian 2/5/1912. Notice re acceptance of Marconi tender for 60,000 pounds per station for the Imperial network. No says P.Minister Fisher. Australia already has a network of Wireless Stations.

File 1540/12.

One report. 4/6/1912.

Officers in Charge residence completed and occupied.

Foreman Mechanics Residence. Built and ready for occupation after 3 days.

Barracks. Built and ready for occupation in a weeks time from date.

Outside boundary fence. 3/4 completed. Two fencers employed on same.

Inside fence around Engine House and Operator's building. Five foot open picket type. Men employed erecting same. 4 men.

Anchor boxes. Being fenced with close picket fence. Men employed 2. Cement finish being placed on floor inside anchor boxes. 3 men employed on same.

Engine room. Broken glazed tiles being replaced.

Men employed by W.A. P.W.D. 7 tradesmen, 5 labourers. total 12.

Water used from M.W.S. 9,500 gallons. Residences not included.

Mast completed.

Anchor boxes completed.

1,000 metre aerials completed.

8 X 600 metre aerials completed.

Counterpoise completed.

Iron straps on Counterpoise posts being painted.

Generating plant run for
21 1/2 hours for half
week ending 3rd. at 420
r.p.m.

Belts running
satisfactorily.

Counterpoise earth switch
being placed in H.T.room.
Total hours plant run to
date 508 hours.

Engine complete except for
temporary water pipe
connection and minor
repairs.

Engine room switch board
completed.

A.C. Generator complete.

Exciter complete.

Air compressor and receiver
complete.

Operators room complete.

H.T. room complete.

File 1656/12

Telegram to D.P.M.G. Perth from Melbourne.

On the assumption that the Fremantle Wireless Telegraphy Station is to be open continuously the staff required will consist of Officer in Charge, Principal engine Driver or fitter, 3 telegraphists plus 3 fitters and drivers. the Minister has approved the following quarters be erected by

the Department. (a). Residence for O.I.C. (b). Residence for Principal fitter, and (c). Bachelors quarters for 3 telegraphers and 3 fitters and drivers and that the absolutely necessary furniture be provided by the Department. It is considered that (a) should be 5 roomed cottage, (b) 4 roomed cottage and (c) should provide 7 bedrooms (6 for officers and 1 for servant or servants), Common dining room, kitchen, bathroom and usual accessories. Staff to make own arrangements as to attendance, cooking and provisioning. Telegraphists appointed to Station be required to use Departmental quarters so that staffing arrangements, hours of duty, etc. may be better under control. Please furnish report in regard to matter early date as possible so that on decision being arrived at, building may be put in hand at once.

22/3/1911. State Works already have in hand 2 residences. Know nothing of bachelors quarters. The three telegraphists in training are married. Modifications may be necessary.

11/4/1911. Melbourne to Perth. Staff to be single men with the exception of the O.I.C. and the Principal fitter. Engage staff accordingly. Mr Hardwicke of the State Works Department furnished with particulars.

1/5/1911 Draft plan inspected.

16/5/1912 Proposal to put a second floor on the single mens quarters. Deputy Post Master General and Chief Architect to confer.

Fremantle Wireless P.M.G. desires single operators quarters altered to provide residence for 2nd operator and Engineer of upper floor and joining accommodation 3rd officer and 2nd Foreman mechanic on bottom floor. Please put Chief Architect in touch with the D.P.M.G. urgently.

Order for two residences and single mens quarters.

16/5/1912. Fremantle Wireless Post Master General requires second storey on the single mens quarters.

No more on that subject.

June 5th 1912. Barracks complete 1 week from this date.

File 1283/12.

Geraldton resite for Wireless Station at valuation required. Naught.

File 1050/12.

Wireless Telegraph Station, Geraldton. Naught.

File 437/12.

Telegraph poles, Jarrah.

27/1/1912. Mr Moens learnt from the electrical engineer for W.A. the wish of the Department that the telegraph poles to be used for sustaining the counterpoise wires of the Fremantle Wireless Telegraph Station shall be of jarrahwood and of the following dimensions at the top.

9 inches for the outer poles, the height above ground being 12 feet. the strain at the top 400 lbs. These poles moreover will be stayed.

7 inches for the inner poles, the height of which above ground will be 18 and 24 feet.

We will comply with the wish of the Department although I would estimate it a favour if one of your officers could

inspect the poles at the mill. The mill in question will be in the vicinity of Perth.

Mr Moens required to give an undertaking to defray the cost of the inspection.

17/2/1912. Letter from Mr Moens to the Electrical Engineer. Poles ready for inspection at Millars Karry and Jarrah Co's Mill at Jarrahdale. Poles ordered 24/18, 24/24, and 2/30 foot.

22/2/1912 C.A.G.Fildes proceeded to Jarrahdale Mill Number 6 at 9 a.m. on the 20th. The poles were 20 miles out in the bush. Proceeded to bush on a rake at 5 a.m. on the 21st. Branded 12/30, 24/24, and 22/18 foot poles. Arrived at Mundijong on the return journey and received advice of fault between Mundijong and Serpentine. Walked to Serpentine and removed bough from line.

28/10/1912. Cost of inspection.

Linesmans time 37 hours at 126 pounds per annum.	37/0
Travelling	15/5
Rail fare	3/8
Sub total	56/1
Office expenses	5/7
Total	3-1-8.

373/12. The electrical Engineer, P.M.G., W.A. wished for the telegraph poles used in connection with the counterpoise to be stayed with galvanised iron stay plates and rods as used by your Department. As they are not available locally could the Department supply at cost.

30 rods Stay @ 2/8 1/2	each	4- 1- 3
30 Plates, Base @ 1/10 1/2	each	2-16- 3
		6-17- 6
+ 25 % on cost		1-13- 5
Total		8-10-11

1248/12.

Leads to be installed below floor.

3/1/1912 Inquiry from Electrical Engineer Perth to Basillie.

4/1/1912 Telegram Melbourne to D.P.M.G. Perth.

Contractor to be informed all leads installed below floor level to be encased in conduit.

Sent to local agents Frank Cadd and Co for Australian Wireless Limited.

Note that Mr Moens the Electrical expert for A.W.L. now in Perth. Address minute to him care of Wireless Station, Applecross.

Acknowledgement from Mr. Moens. All leads intended to be installed below floor level will be encased in conduits which the Works Department is going to make for the purpose according to our indications.

2106/04.

Preliminary conference. In French. 1903.

2346/12

Typewriter and Office Furniture.

28/5/1912. Request sent to C/O.
 28/6/1912. Deputy P.M.G. to Secretary P.M.G. Forwarding request by Mr Tilney for a typewriter. Headed Fremantle Radio Station.
 12/7/1912. Approval for Wireless Telegraph Station, Fremantle. Lino to all floors of the official portion of the building. Room occupied by the Officer in Charge, Foreman Mechanics room, and H.T. room.
 16/8/1912 Letter from Tilney to Electrical Engineer, Perth. Radio Telegraph Station, Applecross. Request for oils and equipment.
 31/8/1912. D.P.M.G. to Cmwh. Works Registrar for W.A. Expedite furniture for Fremantle Wireless Station, Applecross.
 4/9/1912. Advice of Dept of Home Affairs not received regarding furniture and lino.
 25/9/1912. Not yet approved.
 25/9/1912. Cancel order. Basillie. I have arranged for same.
 20/8/1912. Lino and furniture requisition. 31/12/1912.

2416/12

Requisitions for stores and office requisites.

6/5/1912. E.E. to D.P.M.G. Received a batch of requisitions from Mr tilney. No instructions received to date re working or maintenance of the Fremantle Wireless Station. May Mr. Basillie be asked to furnish a list of stores and equipment furnished to Pennant Hills as a guide.

8/5/1912. Mr Tilney requests to be supplied at once with stationery and office supplies.

25/5/1912. Melbourne to D.P.M.G. Please forward requisitions with respect to stores etc.

(Note: rather a comprehensive lot. M.J.C.)

22/7/1912. Secretary P.M.G. to D.P.M.G. Please arrange for articles to be supplied.

There follows a number of folios re charging of expenses to the Wireless Station.

What file.

8/1/1913. Now talking about Perth Radio Telegraph Station.

2722/12.

Tenders. Supply of Kerosene Oil at Fremantle Wireless Station.

30/5/1912. Melbourne to D.P.M.G.

Tender being called for supply of 2500 gallons of kerosene oil. 1,000 gallons in tins. 1,500 gallons in bulk.

Closing 24/6/1912.

Four tenders received.

British Imperial Oil Co. 8 3/4 pence per gallon in not less than 60 parcels.

British Imperial Oil Co. Alternative tender.

Vacuum Oil Co. 10 1/2 Royal Daylight brand.

Vacuum Oil Co. 11 1/4 White rose brand.

Tender of the British Imperial Oil Co accepted on 22/8/1912.
Delivery to be made at the Wireless Station when required in
not less than 60 case parcels.

19/12/12 Melbourne to D.P.M.G. Perth.

State (1). What is present position.

(2). What quantity oil obtained under contract.

(3). Can contract be varied to permit supply of White
Rose as article contracted not suitable for purpose for
which it was required.

20/12/1912. Tilney - Radio Perth.

1,400 gallons delivered. Not seen contract. Dont
know if variable. White Rose supplied by Vacuum Oil Co.

20/12/12. Contractor not willing to vary contract. Will
supply shell brand at one penny per gallon extra and submit
sample if required.

2/1/1913. Head of Stores requesting paper for substituting
150 degree Kero for 130 at Wireless Station.

21/1/1913 Oil urgently required for Perth Wireless Station.
I have had 500 gallons White Rose supplied at 10 pence per
gallon plus cartage.

5/2/1913 2000 gallons White rose ordered from Vacuum Oil.
Present supplies will last until 13th May.

1874/12.

Fremantle Wireless Station. Reports re Inspection of
Progress of Work.

14/11/1911. Oxenham, Melbourne to D.P.M.G. Please arrange
pending appointment engineering officer for Station,
electrical engineers staff to visit site at least twice per
week to inspect work.

29/11/1911. sec. P.M.G. to D.P.M.G. To report through you
twice per week regarding progress of work. Attached sample
form on which such reports should be submitted.

13/1/1912. Letter to Foreman Mechanic Trim, from Electrical
engineer. Re diary, forms, reports, attendance book,
absenting from duty, etc.

This file is full of progress reports and it is impossible
to cover the progress in this summary. Throughout the report
sundry items come up which supplement information which has
not been available elsewhere. The following items have been
selected in that category and are of interest to

M.J.Cullity.

17/1/1912. Buildings completed. Engine room, Accumulator
room, Spare room (stores), Telephone room, Operating room,
H.T.room, Spare room.

Buildings incomplete. O.I.C.residence, Foreman fitters
residence, single mens quarters.

Amount of clearing to site 20 acres.

Windmill complete and in operation, pumping water from well
to station.

Operating room. Switch board erected and fastened in
position and instruments mounted thereon.

H.T.room. Transformer in position and primary coil attached
to A.C. generator in engine room via switch board
(presumably in operators room, see above).

19/1/1912. Lightning arrestor in H.T. room connected to earth plate.

Air receivers connected to H.T. room for relays.

19/1/1912. Temperature 106 degrees F. 11 axemen on the job. Originally only 10 acres were to be cleared. Whole area of 90 acres now to be cleared.

Driving pulley out of square.

Compressed air cylinder connected up to H.T. room for the relays.

Completed to date, A.C. generator, Exciter engine.

Permanent aeriels cannot be erected because of obstructing timber.

Lightning conductor attached to permanent earth plate, which was placed 14 feet below the surface and surrounded with coke.

Mr Moens made several minor tests of receiving apparatus, by receiving messages from boats in Fremantle Harbour which is about 5 miles, but no further tests have been made on account of a couple of glass vessels were cracked in transit to W.A.

23/1/1912. Counterpoise holes being sunk. Circulating water tank stands for engine being completed. Leading in insulators fixed in H.T. room. Relays being connected to keys in Operators room. Structural iron work completed on main mast and connected to earth plate. Vario meters in H.T. room. Also spark table and fans. Transformer in position in H.T. room and connected to switch board in operating room. Circulating water pipes connected to air compressor. Air receiver in position. Switch board in operator's room.

26/1/1912. Air compressor connected to machine. Throw in switch placed in position in H.T. room.

Mast - Lightning conductor earth switch fastened to foundation and connected.

30/1/1912. Vario meters erected in H.T. room and connected to weights in operator's room. Pressure cylinder connected up to engine. Air receiver in position and connected to engine and H.T. room.

2/2/1912. Air compressor and exciter connected to engine by belts. Air starting gear connected to engine. Leading in insulators connected to throw in switch in H.T. room.

Magneto ignition (maybe battery too). Counterpoise lead in insulator placed in position and connected in H.T. room.

13/2/1912. Leyden jars in H.T. room.

27/2/1912. Aerial ammeter in position in H.T. room.

27/2/1912. Clearing of site of station is still in progress, but only two men are employed in this as site is cleared of standing timber to circle boundary, this leaving the corners which contain about 9 or 10 acres.

1/3/1912. Relays splashing badly.

5/3/1912. Pulley flew to pieces. Walls, ceiling, roof, rafters, door, window, and belt race being damaged, as well as the main driving belt.

6/3/1912. Letter from the electrical engineer re water pipe bend. He has not a copy of the contract so cannot say who should replace.

12/3/1912. Ball valve on water supply pipe in circulating water tank.

15/3/1912. Choke coils connected in H.T. room.

Lead caps and iron straps being placed on counterpoise poles.

16/3/1912. Battery room floor covered with lead and completed. (What about the batteries ? M.J.C.)

23/3/1912. The wires will be terminated on the shorter and stouter poles, the others will be utilised as supports only.

29/3/1912. The Electrical engineer visited site to see re telegraph line to clear the counterpoise wires. Neccessary to lay underground, preferably in iron pipes to about location of quarters and residences.

29/3/1912. Wireless Station contacted Melbourne.

2/4/1912. Only two relays in use at present. New ones expected.

5/4/1912. Kerosene lamps erected in Engine room, operators room, and high tension room.

16/4/1912. 8 temporary aerials connected up and erected to second platform on mast.

19/4/1912. 8 X 600 meter aerials being connected to second landing on mast.

23/4/1912. Extra 600 meter aerials being connected and erected.

1,000 meter aerials erected and complete.

26/4/1912. Counterpoise posts being erected along roadway up to station.

3/5/1912. Outside boundary fence under construction. This is a six foot barbed wire fence.

6/5/1912 Letter from A/Sec. P.M.G. Telegraph wires to be grounded within 1,500 yards of the station.

Belt capable of transmitting 400 - 500 horse power.

Only need to transmit 75 horse power. Too large as at

Pennant Hills. Signals read and exchanged with Melbourne.

One fitter and one labourer sufficient. Three telegraphists will be trained at Pennant Hills.

7/5/1912. Two 1,000 meter aerials blew down during a gale.

10/5/1912. Aerial feeder wires assembled and stayed. Roof of engine room repaired after a gale.

14/5/1912. New earth switch placed on mast foundation.

21/5/1912. Four extra 600 meter aerials being made and when erected will make 10 - 600 meter aerials erected.

31/5/1912.

Two 600 meter aerials being placed further apart.

11/6/1912. Choke coils being temporarily erected in H.T. room.

18/6/1912. Two 600 meter aerials being shifted away from guys.

28/6/1912 Electric light erected in operating room. Signal bell and engine room complete.

2/7/1912. Wires being prepared for shortening all (24) 1,000 meter aerials.

At present 1,000 meter wave aerials are 100 meters long, and when shortened will be 62 meters long so as to reduce capacity.

5/7/1912. Paths being formed and gravel placed and rolled around Operator's House and Engine House.

7/7/1912. Outside electric lighting being placed on operators building. Signal bell cable run underground from Operator's room to Engine room.

9/7/1912. Mast. Ends of small aerial wires where attached to stays in the ground, are being covered with cases to protect from moisture.

16/7/1912. Twenty four 1,000 meter wave aerials being shortened. This completes the shortening of all the 1,000 meter aerials.

19/7/1912. Electric bell erected in Engine house.

23/7/1912 Levels taken of site for another cottage which will be commenced in a few days.

Extra egg insulators being placed in small aerials.

Small marble electric light and switchboard being made for engine room. (rather marble switchboard and electric light. M.J.C.!).

26/7/1912 electric light being erected in engine room.

2/8/1912. telephone fixed permanently in Telephone room.

6/8/1912. Insulators being straightened on inner counterpoise posts.

23/8/1912. 960 gallons of fuel oil to hand in tins.

26/8/1912. Counterpoise connected temporarily to earth for experimental purposes.

30/8/1912. D.C. generator complete. (This used to be exciter complete. I wonder if there is any significance. M.J.C.?)

3/9/1912 Oil received at station -

960 gallons kerosene. 130 degrees.

48 gallons generating oil.

96 gallons gas engine oil.

7/9/1912. 960 - 130

100 - 150

48 Benzene.

96 Gas engine oil.

48 Generator oil.

10/9/1912. Fibre matting received.

13/9/1912. Engine stopped for complete overhaul. Total hours plant run to date 1057 3/4.

27/9/1912. Counterpoise again connected temporarily to earth.

References.

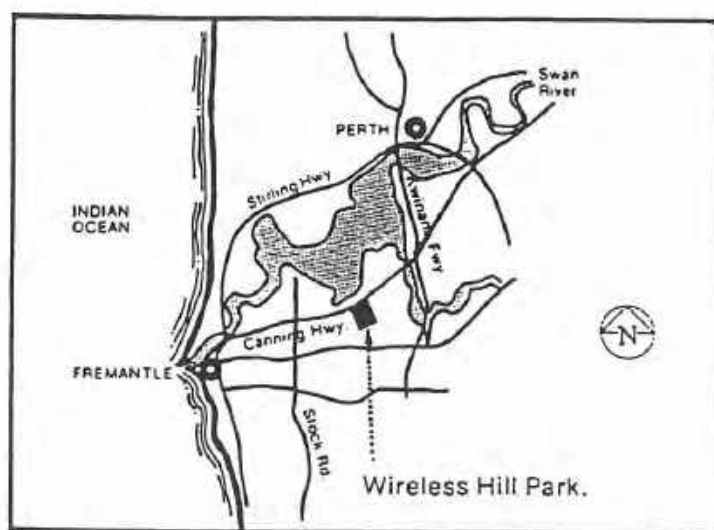
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 Taming the Tyrant. The first one hundred years of
 Australia's international communications services. Edgar
 Harcourt.
 Girdle Around the Earth. The story of Cable and Wireless.
 Hugh Barty-King.
 Pictures, Battye Library. Nos. 8984B, 8992B, 6780B/1-3,
 6824B. (Note. 6824B does not appear to be
 Wireless Hill at Applecross.)
 Wireless Today, 1936. E.H. Chapman.
 Memoirs of Murray Joseph Johnston. (Held at Wireless Hill).
 Mrs. Linley Batterham. Significant dates in the history of
 Wireless Hill Park, its varied services
 and many controversies, etc.
 Mr. Tom Berg. V.H.F. radio group.
 Mr. Jack Sullivan. V.H.F. radio group.
 Mr. F. James. Employed at Wireless Hill by A.W.A. 1942-1947.
 President, O.T.C. veterans association.
 Mr. Norm Odgers. Ex O.T.C. Employed by A.W.A. at Wireless
 Hill. 1942.
 Mr. Trigwell. ex Superintendant Radio Branch, P.M.G's.
 Department.
 Mr. D. Kinnersley retired O.T.C. Mosman Park, 1962.
 D. Rickman. ex Chief Electrical Engineer P.W.D. (verbal).

Possible avenues of future research not availed of as part
 of this exercise.

Annual reports P.M.G's Dept 1911 - 1922.
Annual reports A.W.A. 1911 - 1940.
Archives A.W.A.
Archives. Commonwealth Government. Victoria.
P.W.D. files.
6PR.
Police. Annual reports and records.
West Australian Newspapers photographic records.
Learned Society papers.
Wireless journals of the period.
Sydney daily papers. Any description of Pennant Hills may be
relevant to Applecross.

LOCATION AND SITE PLANS.

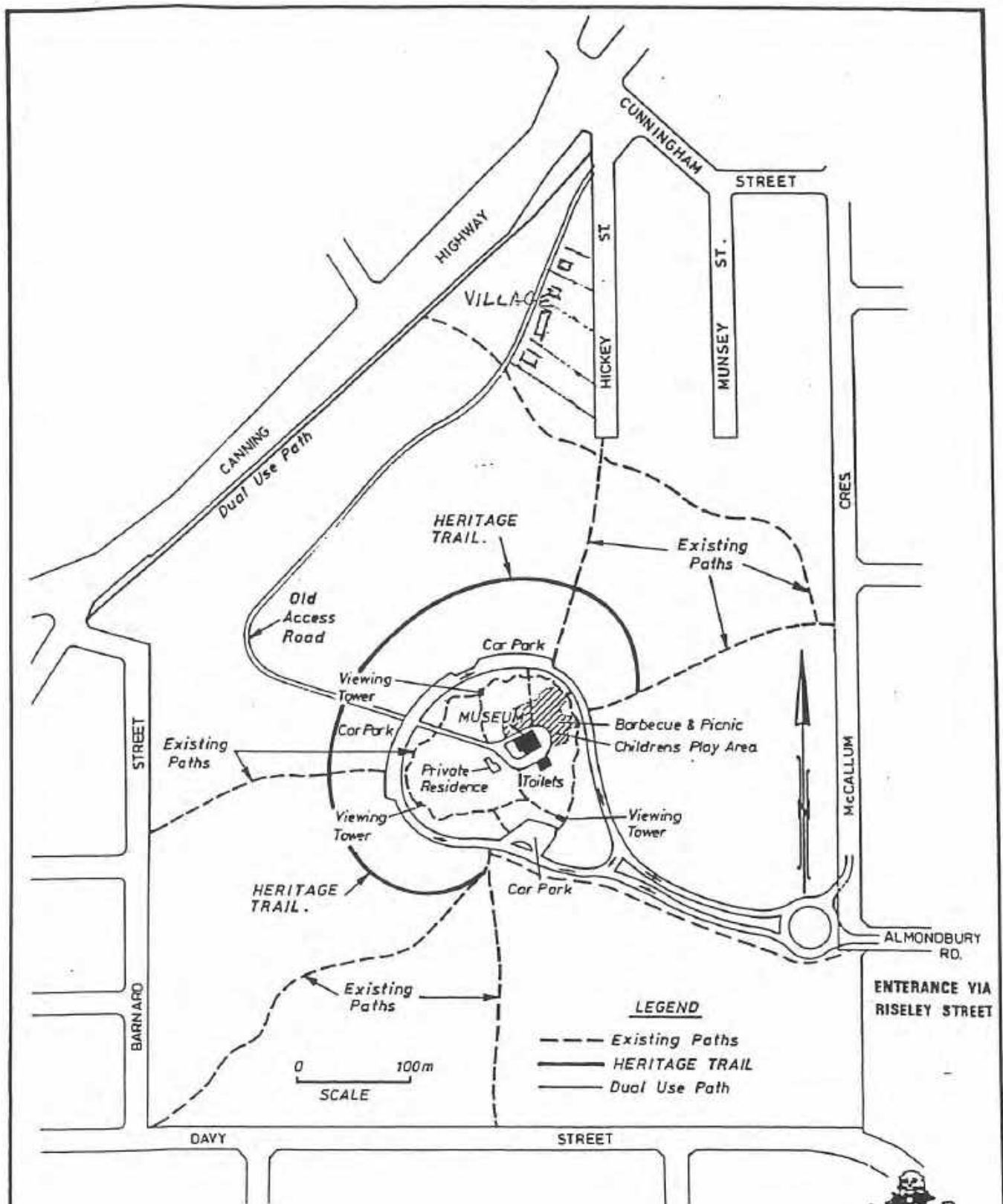
Location Plan. Taken from the Wireless Hill Park, Heritage Trail Brochure.



Site Plan. See, City of Melville Plan No 118A4-87PG attached.

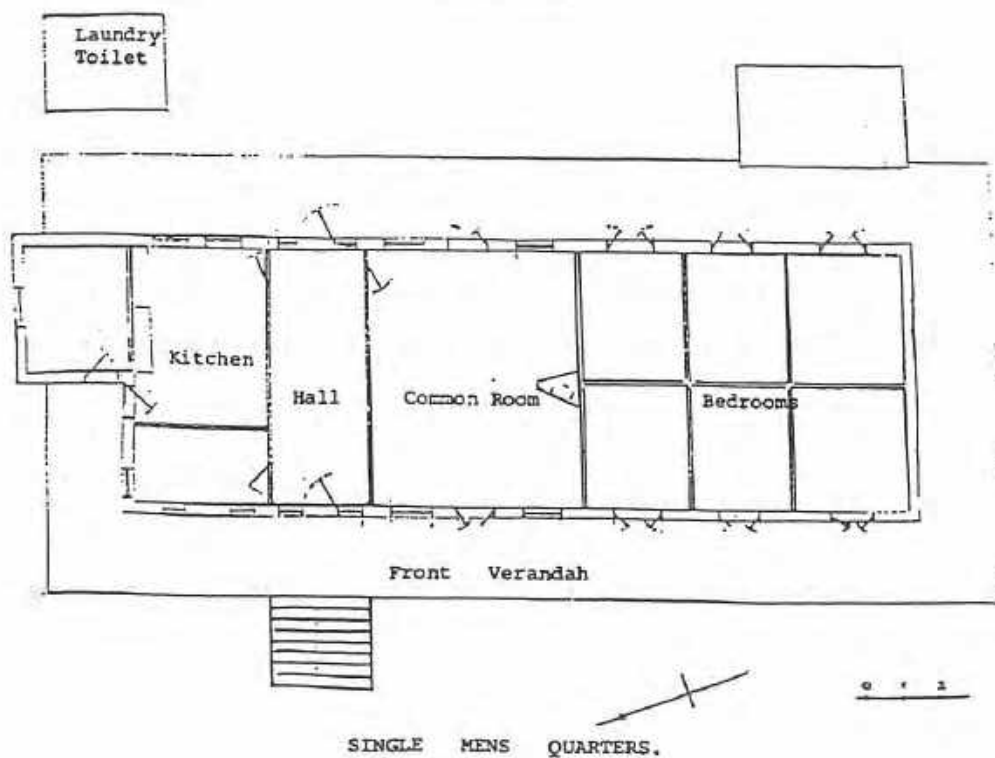
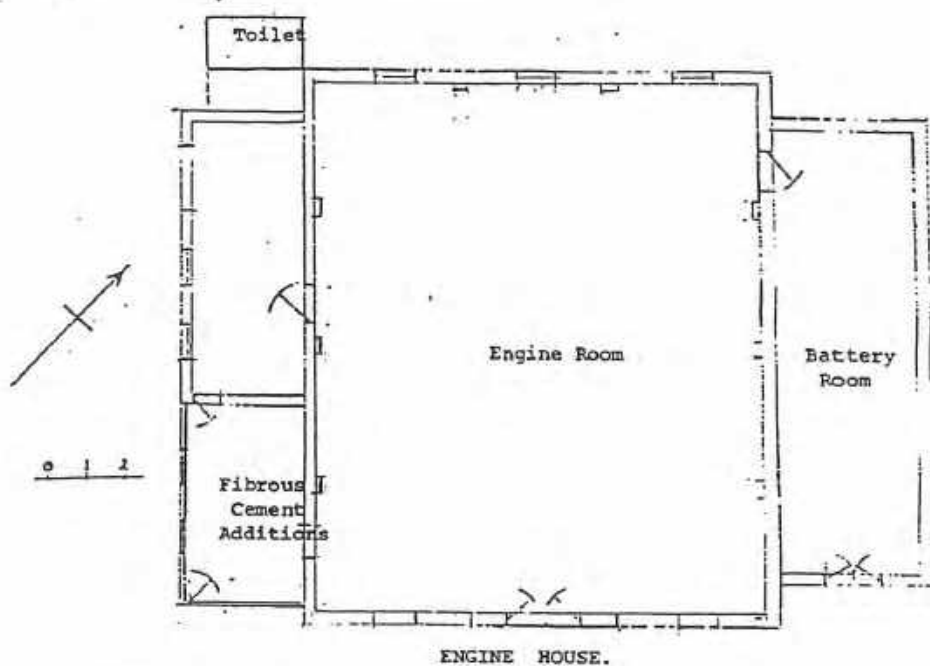
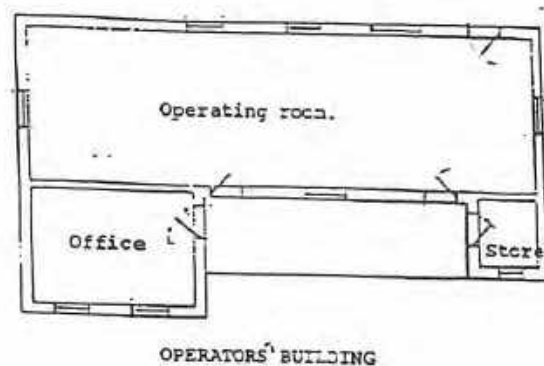
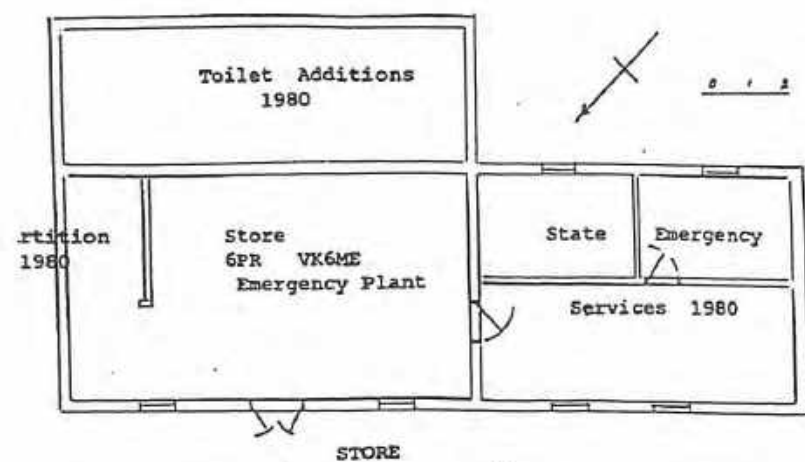
Note :-

- 1) The Museum was the Engine House.
- 2) The building marked "Toilets" was the store.
- 3) The "Private" Residence was the Operators Building.
- 4) The three "Viewing Towers" were the anchor blocks for the mast.
- 5) The original mast was located at the rear of the residence approximately on the line between the residence and the lettering.
- 6) The position of the dwellings forming the village have been marked on the attached plan. The residences front on to the old access road. The positions are representative and approximate only and are not part of the City of Melville plan.



DESIGNED			CITY OF MELVILLE	
DRAWN	D. GOODWIN	JUNE 1985		
TRACED	M. CRIBB.	NOV. 1987	WIRELESS HILL PARK HERITAGE TRAIL PLAN.	
CHECKED				
APPROVED		SCALE 1 : 5000	FILE No. XW 20/3/19	PLAN No. 118A4-87PG

PLANS.



Appendix 6.

A study of various photographic records in an attempt to determine their function and to record the changes made over the years.

1. Operators room 1912. Photograph held at the Wireless Hill Museum. This picture is similar to a photograph published in the Western Mail of 17/2/1912 except that there is a full view of the switchboard. To the right, on the bench and wall is the Telefunken receiver. It looks the same as a picture of the receiver at Pennant Hills at the same time. The switchboard is of two panels. The right hand panel has a voltmeter registering 200 volts, an ammeter, a frequency meter registering five hundred cycles, a main switch and a regulating handle. This is obviously the switchboard controlling the output of the 500 cycle alternator which powered the Telefunken transmitter. The left hand panel has a voltmeter, two ammeters, two small switches, a regulating handle, and two groups of two fuses as in a D.C. circuit. This seems to be a D.C. control board and the regulating handle would imply control for a D.C. generator. Reference has been made in the construction reports of an exciter or D.C. generator belt driven from the main engine and it has previously been postulated that this would have been used as excitation for the alternator as well as to charge the batteries and run the lights in the first instance. This would have been controlled from the above switchboard.

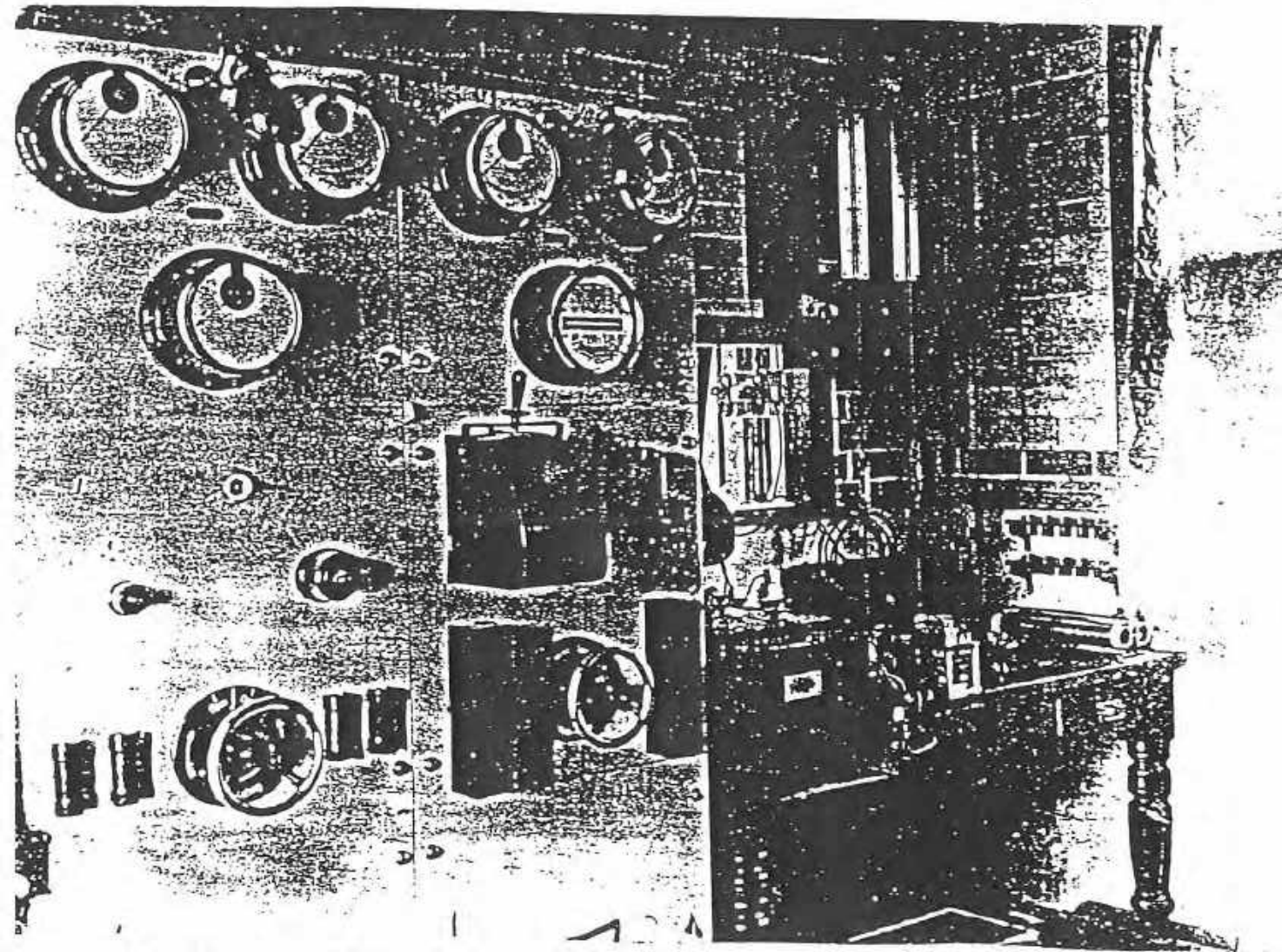


Fig 21. Operator's Room, 1912.

Reproduced by courtesy Wireless Hill Museum, City of Melville.
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Appendix 6.

2. Operators room 1916. Battye Library 8989B.

This is the same view as in (1) above and would be during the period when the station was operated by the navy. Many changes have taken place. All the equipment on the bench under the window seems to have been added since the opening of the station. Due to the angle of the picture it is not possible to see if the Telefunken receiver remains.

It is thought that at this time the station would have been converted to the electric supply authority's mains and most probably the Poulsen transmitter installed. The original double panel switchboard mentioned above has gone and has been replaced with another one. Whether this is indicative of the phasing out of the Telefunken transmitter is not known. With the 500 cycle alternator now presumably driven by an electric motor it is conceivable the method of control being changed. One is only guessing to delve further. There is an electric fan and a typewriter. On the left of the window is a panel with two tuning dials and this could possibly be a receiver.

8989B

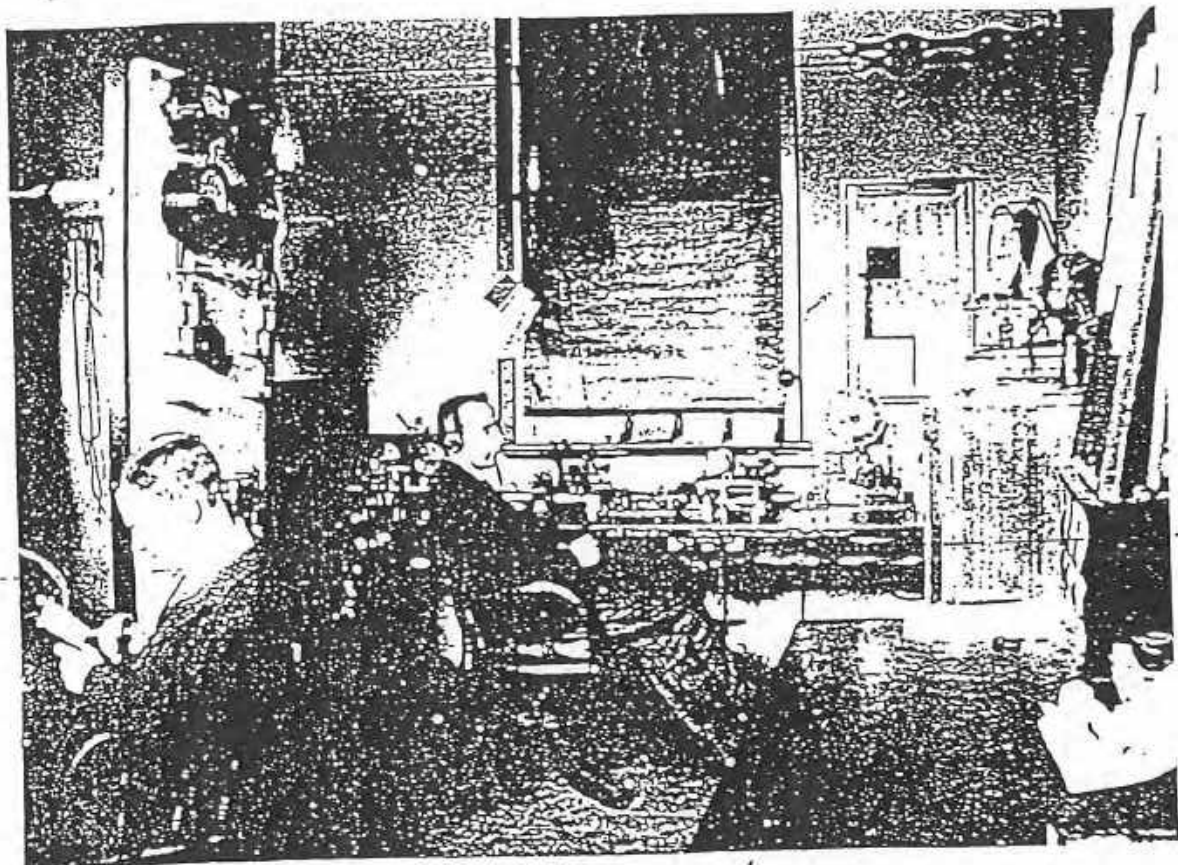


Fig 22. Battye 8989B. Operators in the Operation Room at Wireless Hill, c 1916.

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3. Photograph of Gardner semi diesel engine driving the 500 cycle alternator for the Telefunken transmitter. Battye Library 8988B.

There is another photograph at Wireless Hill showing the engine coupled to the 500 cycle alternator. As mentioned in the text it is thought that this engine was belt coupled to the 500 cycle alternator, the exciter or D.C. generator and the air compressor. The air compressor can be seen in the middle foreground of the photograph. There is no evidence of the exciter.

The machine had a 4 foot diameter flywheel. Whether this was abnormal or not is not known. This large size was related to the speed of the machine (420-500 rpm) and presumably was to maintain a uniform speed and thus frequency when step loads were applied as a result of signals being transmitted. Also a large pulley on the motor and a smaller one on the alternator would turn the rotor of the alternator at a relatively high speed and facilitate the generation of a high frequency.

There is no radiator for cooling the engine. In picture 12 below (from up the mast) there are three or more tanks on the north west side of the engine house. These would have provided cooling for the engine.

The pipe from the exhaust passes to the north of the building. In the picture from up the mast a shadow can be seen on the ground of a pipe presumably the exhaust passing up through the roof.

Joseph Murray Johnston speaks of a belt trench and a 12 inch belt. This can be seen running in a north south direction.

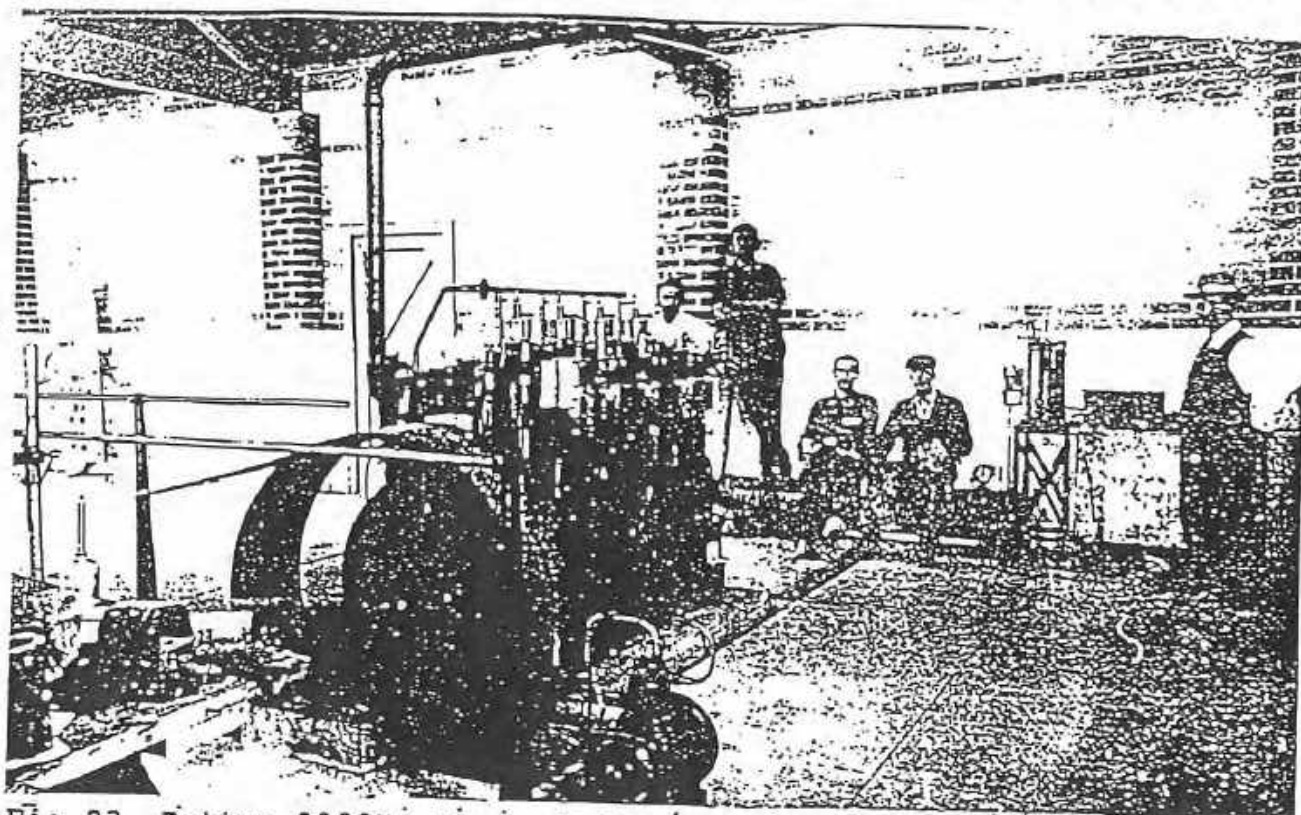


Fig 23. Battye 8988B. Part of the installation at Wireless Hill. c 1912. Reproduced by courtesy Battye Library. Not to be further reproduced for any purpose without the written consent of the Library Board of Western Australia.

Appendix 6.

4. Spark transmitter being installed in the South west corner of the operators building. Photograph held in the Wireless Museum, Applecross. No date.

There is a picture of an identical unit on page 44 of Electronics Australia, April 1989, with the heading "The high tension room at the Pennant Hills station, showing the original Telefunken equipment installed by Austrasian Wireless Ltd."

Also another picture in "Seawatch" page 25 of presumably the same unit used for marine operations by Sydney Radio, Pennant Hills in 1916. That unit was called an air cooled spark transmitter.

This is obviously the original Telefunken spark apparatus. Dowsett in Wireless and Telegraphy published in 1920 says "In the Telefunken type of discharger, the electrodes are heavy copper plates, which are sometimes provided with channels through their thickness for an air blast. As an ionised gas can get rid of its charge most completely and quickly in a small gap, the discharger consists of a number of small gaps in series, one gap of .15 mm. - being allowed for each 500 -700 volts of condenser potential.

One can speculate from the photograph that there were six spark gaps each enclosed in a housing probably all connected in series with an air blast through each, provided by the three centrifugal fans in the base. The photograph also shows the large wireless frequency coils and high voltage capacitor, and some form of output power meter.

6. O.T.C. Archives photograph number PH/931. 1921.
In this picture you can see the small engine driven generator/alternator remarked on in the previous photograph. The flywheel and exhaust pipe of the engine can be just seen and the engine would seem to be of a similar size to a Lister engine. The Broadcaster of 1934 and the Radiogram of 1931 referred to a Chapman Pup engine driving an auxiliary transmitter. The engine in this picture is not a Chapman Pup. The 1931 report said "the next to be introduced" implying the Chapman Pup came at a later date. What this engine was for is not known.

In 1916, A.C. electric power was connected to the site. There were two 75 kva. transformers. Rotating generators and alternators were still required to generate the various voltages and frequencies required by the station. It would be far more convenient and quiet to run these with electric motors. The original diesel would have then been coupled to a standard frequency alternator for an auxiliary supply in case of power failure.

In the foreground of the picture is an electric motor driven motor alternator. This would be the 500 cycle alternator previously driven by the Gardner diesel engine. In picture number 7, i.e. O.T.C. photograph PH/932 one can see what looks like a toothed rotor implying a high frequency alternator.

The switchboard will be referred to in photograph number 7.

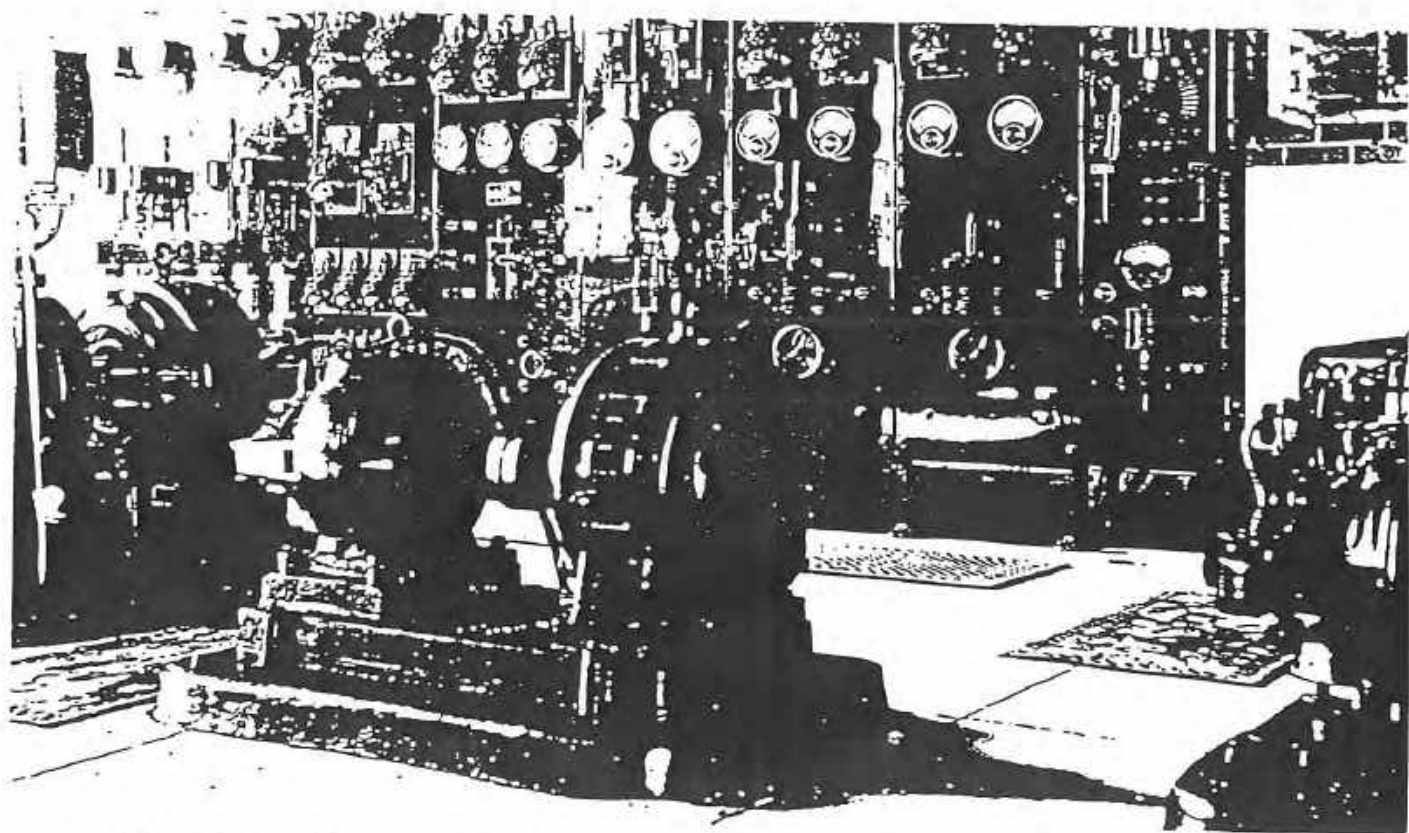


Fig 26.O.T.C. PH/931. View of Engine room 1921.
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7. O.T.C. photograph number PH/932. 1921.

20 and 60 Kva generators located in the back room of the Station and used for power for the transmitters.

Machinery in this picture are :-

1. Two large motor generators at the far right hand side. Presumably 60 Kva. or Kw.

2. A smaller motor generator in the right hand middle. Presumably 20 Kva.

3. The motor alternator in the foreground. Presumably 500 cycle.

4. There is another machine behind the motor alternator in the foreground. If it is the same machine as in the next photograph, it is a motor generator.

The plant we know about that need generated power are :-

1. The 60 kw. Poulsen transmitter. One must assume the motor generators in 1 above provide power to this transmitter. The O.T.C. covering letter refers to 60 kva generators used for power for the transmitter. A kva rating normally applies to an alternator and Kw to generators however for Direct current electricity Kva and Kw are the same.

2. The Telefunken transmitter. The motor alternator in 3 above seems logical for this purpose.

3. Charging the batteries. Providing the Telefunken transmitter is still in use, there is still a need for D.C. power. The motor generator in 2 or 4 above seems possible for this purpose. Note there is still the Lister engine driven generator in picture 6 which can be used for this purpose in the event of mains power failure.

There is still a motor generator for which we have not a use. The O.T.C. letter refers to 20 kva generators as well as the 60 kva ones for supply power to the transmitters. It is possible that a smaller generator was used when operating on reduced power.

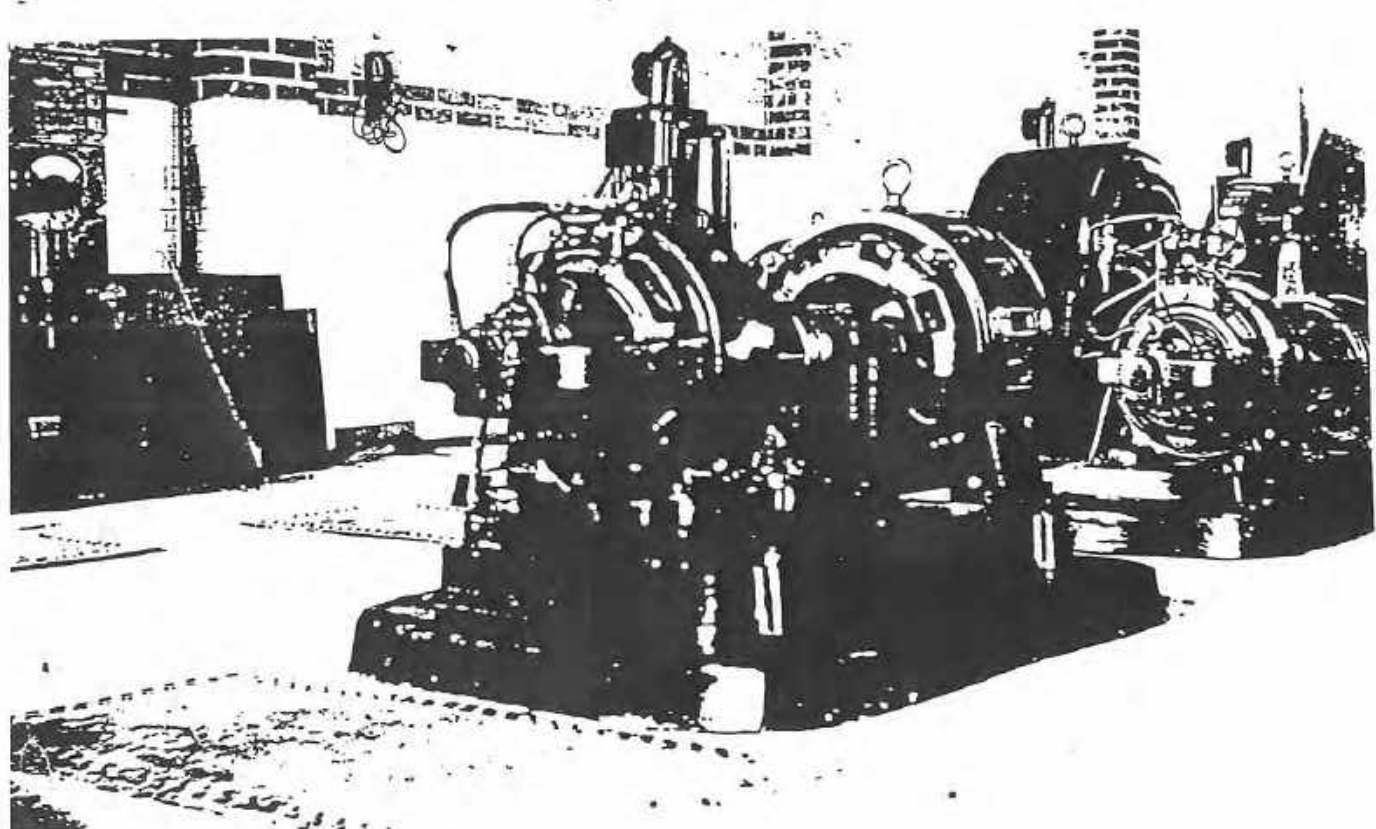


Fig 27. O.T.C. PH/932. View of Engine Room 1921.

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8. O.T.C. Archives number PH/001341. 1915.

O.T.C.s. date is obviously in error. The machinery is exactly the same as in photograph number 9 following, published in "The Radiogram" of July 1931. It has to be after the C.R.S. transmitters were installed in 1927. The motor generator for the police transmitter would appear to be in evidence and this would date the picture as 1931. The Radiogram says :- "One side is reserved to the emergency plant". That has to be the side nearest the operators building that is on the left hand side when entering the room and not in the picture. The emergency plant is then still in the main engine room and not in the room alongside, where Mr. James said a Fordson set was located in 1942. It goes on. "Opposite is the C.R.S. generating unit and short wave auxiliary - to the uninitiated two uncanny installations which apparently stop and start themselves"... etc.. "Adjacent to the C.R.S. units is ..etc.. a younger brother of the C.R.S. one and supplies power to the Police service transmitter..etc..". This is specific. A generating unit for the C.R.S. transmitter. Another installation for the short wave auxiliary, and a younger brother of the C.R.S. for the Police transmitter. That is three generating units. It goes on to talk about the sets in the coastal set up and mentions three transmitters. Whether the two motor generators work the three transmitters or whether there is another motor generator somewhere is not clear. Mr. Trim in the article in the Radiogram of September 1931 talking about the Police transmitter said "The power plant consisted of a separate direct coupled motor-generator set, interchangeable with the coastal power unit, and also with the emergency power unit". This is consistent with the July article.

George Moss who worked for Nicholson's in the early days before lecturing at Mt. Lawley Technical College has said that the 6PR transmitter was located in the third building and the high tension D.C. voltage for the transmitter was derived from a motor generator in the engine room. He also said the filaments of the transmitting valves were supplied with alternating current

If we now turn to the picture :-

The two large motor generators which were mentioned in picture 7 are in the background but were not mentioned in the report in the Radiogram in 1931. If the Poulsen transmitter had been removed at this stage and these machines were out of use then perhaps they would not have been mentioned.

On the left of the picture we can see the flywheel of the engine which it was postulated provided D.C. power to charge the batteries and energizing current for the Telefunken transmitter in the event of power failure. Again this is not mentioned.

The plant left of centre is not very young and would appear to be the oldest item of plant.

The unit to the right of centre seems the obvious choice as the C.R.S. motor generator. There is one motor and two generators on a common shaft. One of the generators would supply power to the filaments and the other the high tension voltage.

The small plant in the foreground would then be the power supply to the Police transmitter. It certainly looks like a younger brother to the C.R.S. unit, again with one motor and two generators..

That leaves the old unit left of centre as the supply to the short wave auxiliary. This has only one generator on the shaft and one wonders what powers the filaments of the

Appendix 6.

There appears to be a motor generator missing to power 6PR. The unit postulated to power the short wave auxiliary could be the supply to 6PR. One motor generator could power a number of units. No more can be said without further information.

Returning to the switchboards in photographs 5 and 6. Looking at the switchboard along the rear of photograph number 6. This picture seems to be taken at a different time to picture number 5 in that one control on the sixth panel from the left appears to have been changed. A lot is indeterminate due to a lack of information. This switchboard would date from the connection of the electric supply by the Electricity supply authority and the

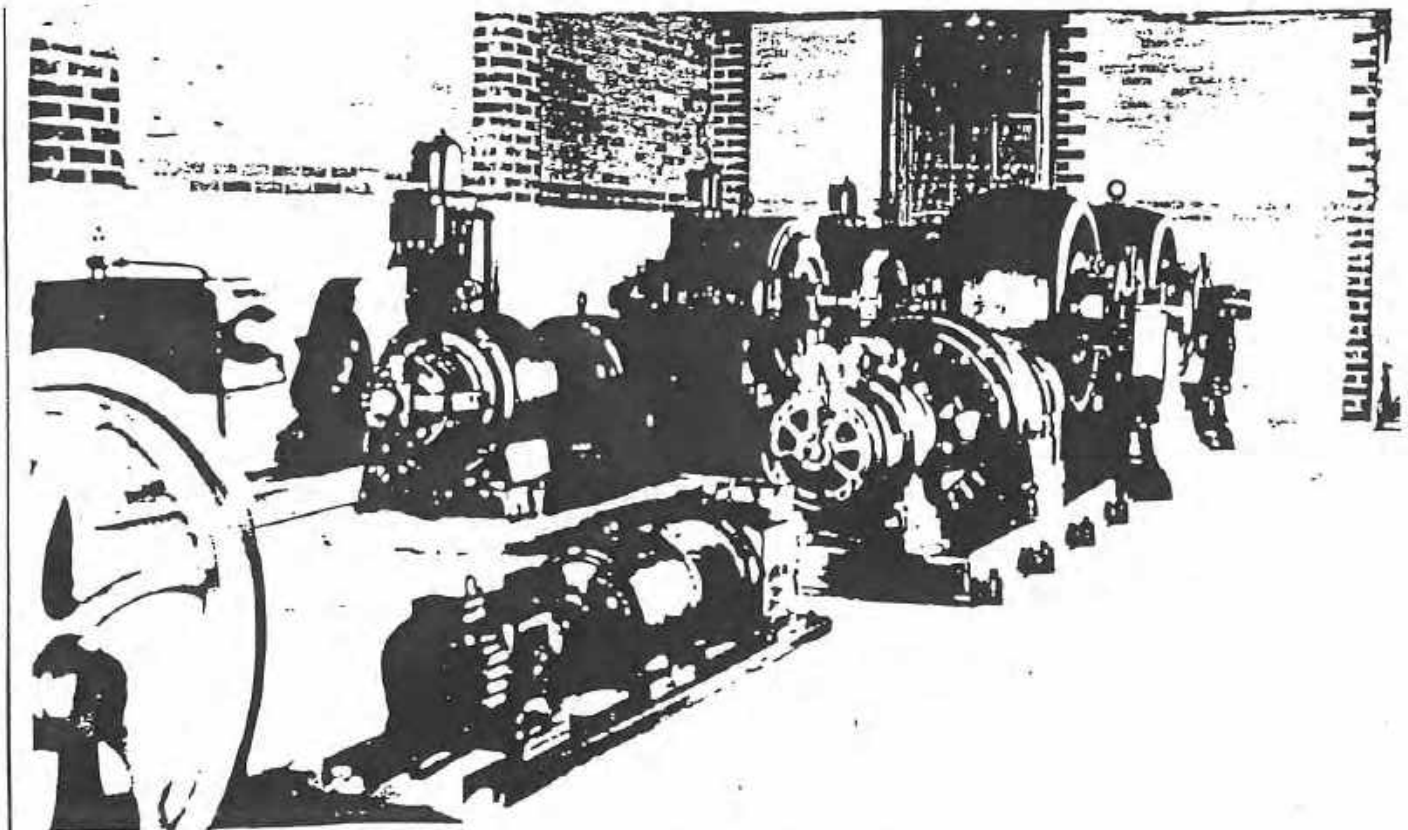


Fig 28. O.T.C. PH/001341. View of Engine Room. (For date, see text).

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installation of the Poulsen transmitter during the reign of the navy. If we talk about the panels numbering them from the left. On the top of each of panels 1 and 2 are two circuit breakers which would control the incoming power from the supply authorities transformers. These would presumably parallel the two supplies behind the switchboard. On the bottoms of panels one and two, are fuses which would isolate sections of the station in the event of that particular section incurring a fault. Panel three, and probably the top of panel four is filled with motor starting and running contactors. The remainder of panel 4 seems to be taken up

generators/alternators. For each machine is a meter and a double pole knife switch implying either a D.C. or a single phase A.C. machine. There are also two control handles for adjustment of voltage of that particular machine. One could be for the engine driven generator and one for the electric motor driven battery charging supply. Why there is not a third control for the third machine is impossible to say. Panels 5, 6, and 7, all seem to be the outputs of D.C. generators. One could surmise they are the two 60 Kw. units and the 20 Kw. generator referred to above for operating the Poulsen arc transmitter.

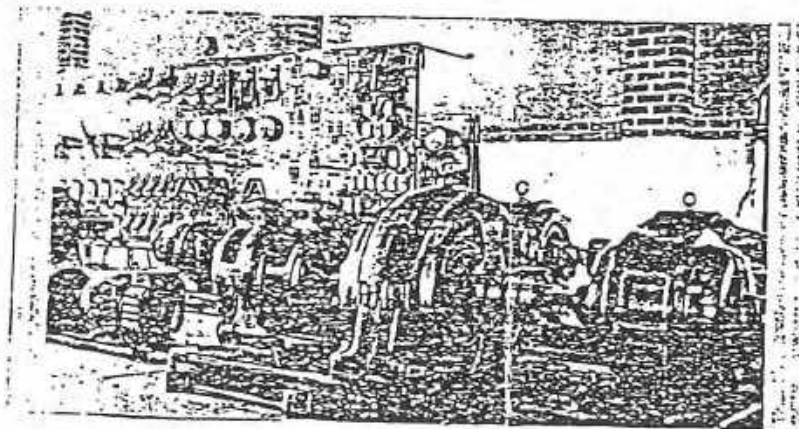
Panel 8 could be the input from the emergency supply alternator. There is an incoming cable at the bottom, a meter, a triple pole change over knife switch implying three phases, and at the top possibly an automatic voltage regulator. Today the action of transferring load would be accomplished using electrically and mechanically interlocked contactors or breakers and not a knife switch. To the right top of panel 8 appears to be a small white board with a couple of incandescent lamps. This would be a panel used to synchronize the alternator frequency with the supply mains when bringing the auxiliary set on line. If the two wave forms are not in exact synchronism, the whole station could be put off the air. It seems a bit hazardous using an open knife switch for this purpose.

9. The Radiogram 1931. V.I.P. Generating units and Switchboards.

The plant that is visible has already been referred to. The two large motor generators which were in the previous picture are not visible due to the angle of the picture. The police transmitter was installed about July 1931 and as they were in the previous picture they must still be present.

If we look at the switchboard, panels 6 and 7 have been materially altered since the picture in 1921. Previously these panels were conceived to handle the control of two largish motor generators. This reinforces the notion that the Poulsen transmitter had been removed at this stage and the two large motor generators removed from service and disconnected.

The Radiogram also made the comment when speaking about the C.R.S. transmitter, the short wave transmitter and the Police transmitter, that "These units are so wired that they are interchangeable etc". The units are of different sizes



VIP Generating Units and Switchboards.

so there must be some limitations to this statement.

Switchpanel number 6 now seems to be full of changeover knife switches and these could provide the interchangeability referred to above. Panel 7 is then some form of fuse distribution panel the purpose of which is not very clear, and panel 8 remains unchanged. The synchronization panel has now disappeared from the end of the switchboard. This is not surprising as the supply authority would not allow private plants to parallel with the mains supply and switching over by means of the knife switch with the equipment running could be rather hazardous.

10. O.T.C. Archives photograph number PH/ 001157. Operator's desk. Date unknown.

The panel on the left of the desk with the meters, control handles, and switches would be the remote controls for the C.R.S. generators referred to in the Radiogram of 1931. The C.R.S. units were installed in 1927; "two uncanny installations which apparently start and stop themselves". The picture must be 1927 or after. It is before the picture in the Broadcaster of 1934. Immediately to the right of the remote control panel on the desk is the receiver. Today, that is in 1992, when we ourselves want to change to a different wave band on our short wave receivers we merely turn a switch. In the receiver in the picture the different wave bands were selected by unplugging the coils from the front of the receiver and replacing them with another coil pertinent for the frequency band required. You can see the spare coils hanging on the right hand side of the remote control panel. To the right of the receiver at the front of the bench is the morse transmitting key. To the right again is the manual telephone switchboard. The equipment to the right again against the wall is difficult to decipher. At the rear on the left one can see a valve transmitter, probably the C.R.S. transmitter referred to with possibly another further back.

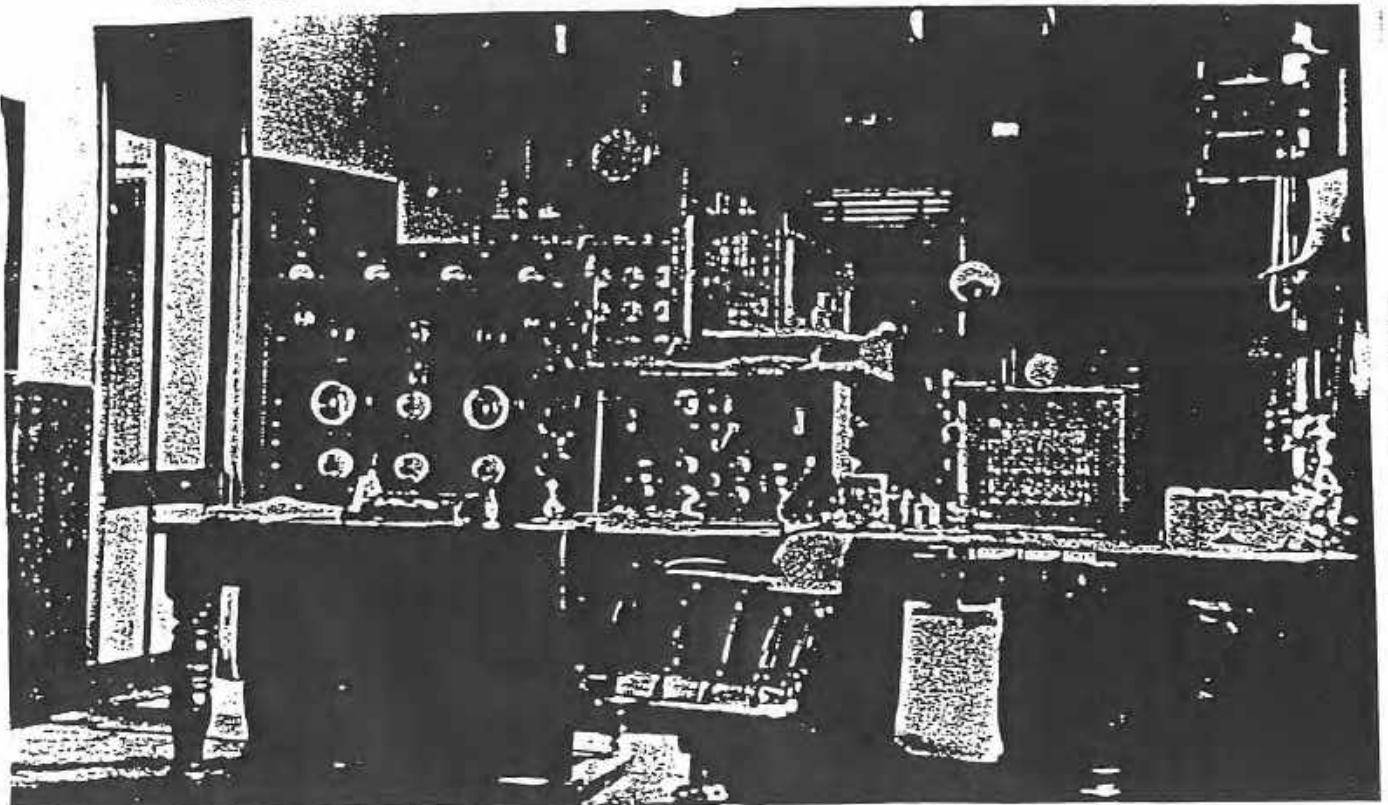
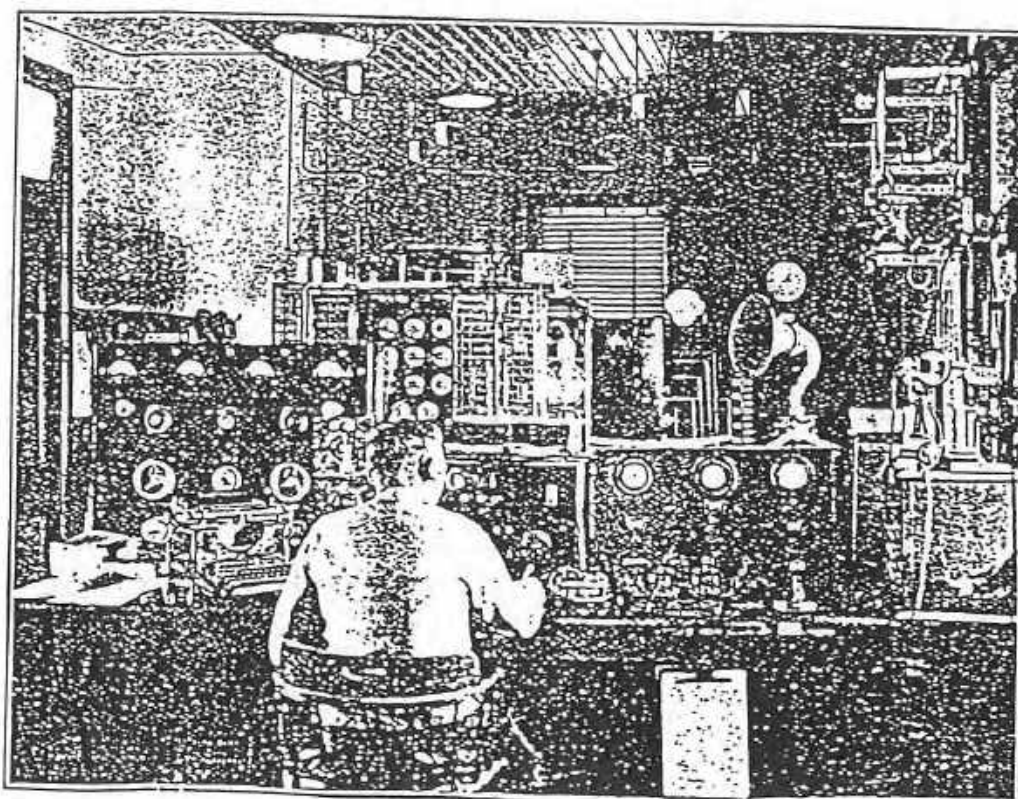


Fig 30. O.T.C. PH/001157. Operators Desk.
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11. Operator's room. Broadcasters Annual, 1934.

This is a picture of the operators room from a similar position to that in the O.T.C. Archives picture above. Certain changes are apparent from the last picture. The remote control panel is still there. The same receiver is to the right of the panel. The text refers to "He has at hand also a unique feature in the form of a wave changing switch (capstan wheel control) with which he is enabled in one movement to change all associated circuits throughout the frequencies allotted to the station. This is probably the only one of its kind in existence". The spare coils are missing from where they previously were located at the right hand side of the remote control panel, and in their place is some equipment, probably the capstan wheel control referred to above. The clock has gone from above the transmitter and one is now mounted on the rear wall. The valve transmitters at the rear on the left appear to be unchanged. The operator now has a typewriter at his left hand. The telephone panel has been moved to the far right of the bench leaving room for a what looks like a transceiver having a microphone and loudspeaker facility. Up on the wall on the right hand side, some sort of inductive coil has been mounted.



IN THE MAIN CONTROL ROOM.

Fig 31. Operators Room. Broadcasters Annual 1934.

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This is a reproduction taken from a photograph album held at the Wireless Hill Museum. The photographs are not titled and it is not possible to positively say at this stage that this is the original mast at Wireless Hill. If it is not, then it is remarkably like it and it would have to be of another Telefunken station, perhaps Pennant Hills. The origin of the album needs to be identified and the movements of its owner.

In this picture we can just see the radiating umbrella antennae at the top of the mast. We can see the stays to the mast and we can speculate that the cables nearest the ground connect to the counterpoise wires mentioned on page 19.

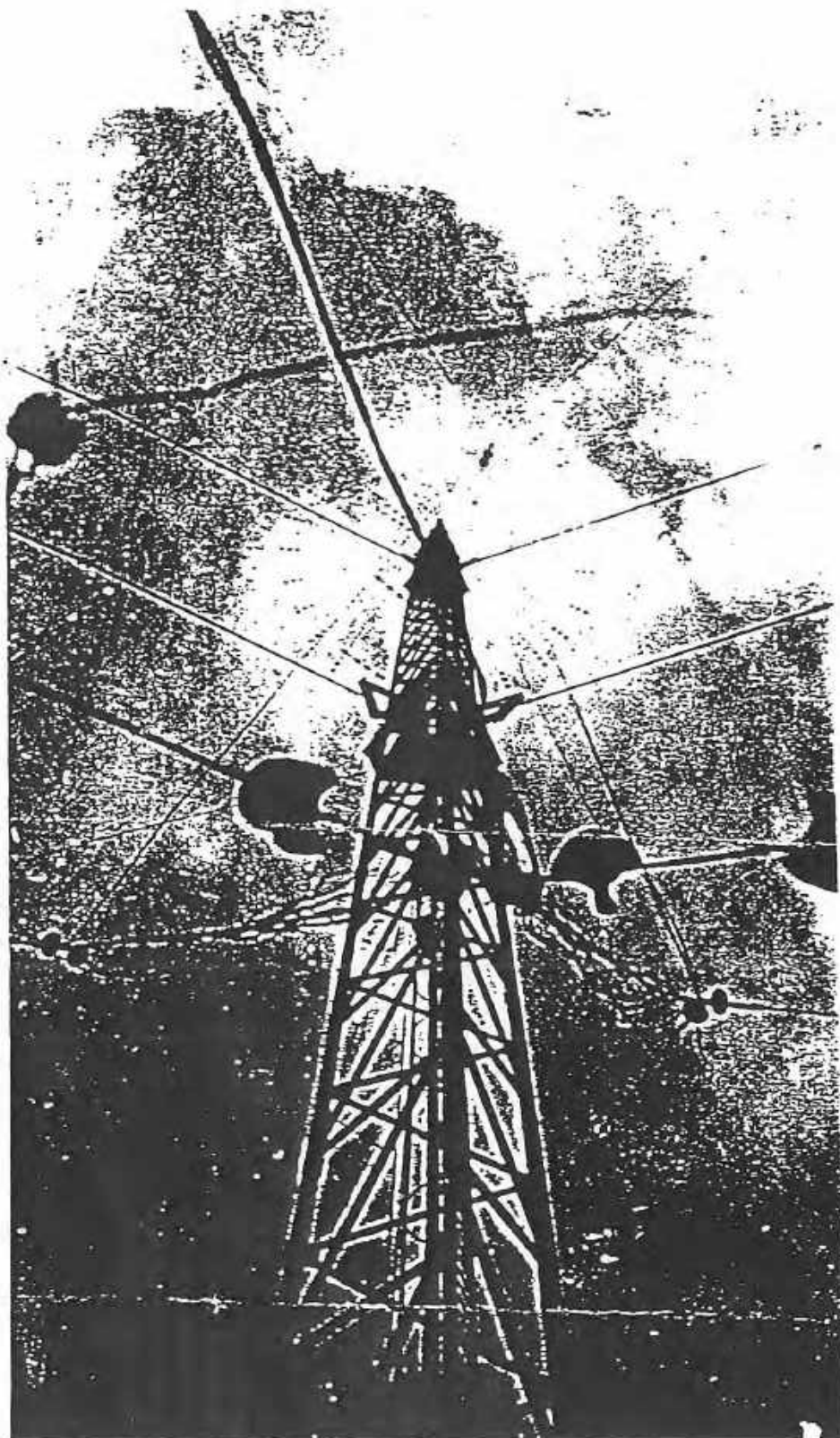


Fig 32. View from below looking up mast.
Reproduced by courtesy Wireless Hill Museum. City of Melville.
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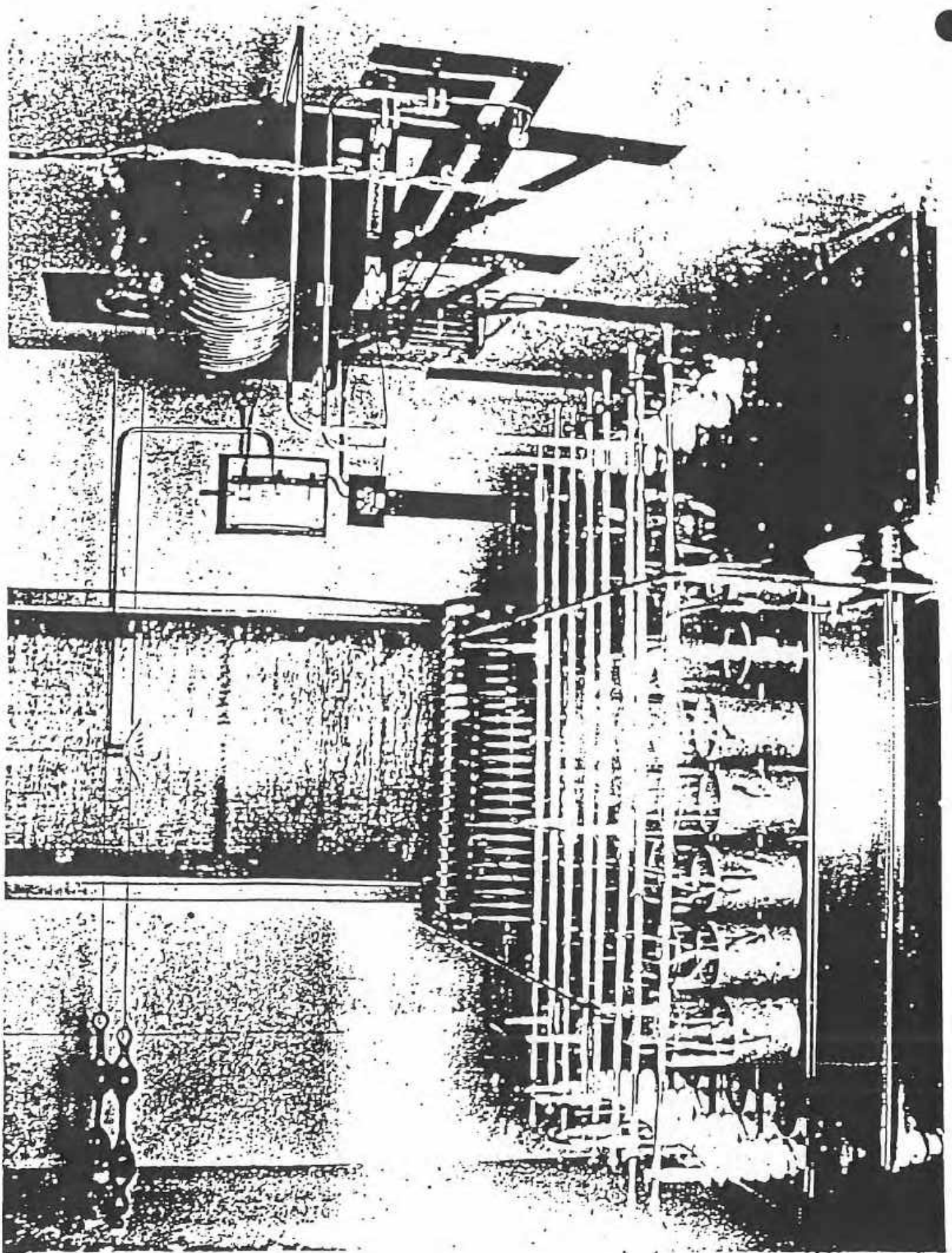


Fig 33. View of Tuned Circuit Room.
Reproduced by courtesy Wireless Hill Museum. City of Melville.
Not to be further reproduced without permission from the City of
Melville.

13. Tuned Circuit Room. Operator's Building.

As with the previous photograph this cannot be definitely identified as belonging to Wireless Hill.

Physically it looks like it fits in the central room of the building, the walls, the window.

Electrically it is what is needed. In the photograph of the spark transmitter (Appendix 6 - 4.) a lot appears to be missing. The coils in the photograph of appendix 6-4 would presumably be choke coils in the supply lines. Radio frequency coils and capacitors appear to be missing.

This photograph provides the missing components. The Radio frequency coil. The Leyden jars for tuning capacitors. The knife switch to the right of the window could well be the earthing switch for the aerial. How one gets across to the switch is hard to imagine. The two cables running across the window from the left would be the cables coming from the spark transmitter and this location agrees with the matching cables in appendix 6-4. One is at a bit of a loss to see how the cables are insulated where they come through the wall.

If this is not a photograph of Wireless Hill it has to be a photograph of a remarkably similar station.

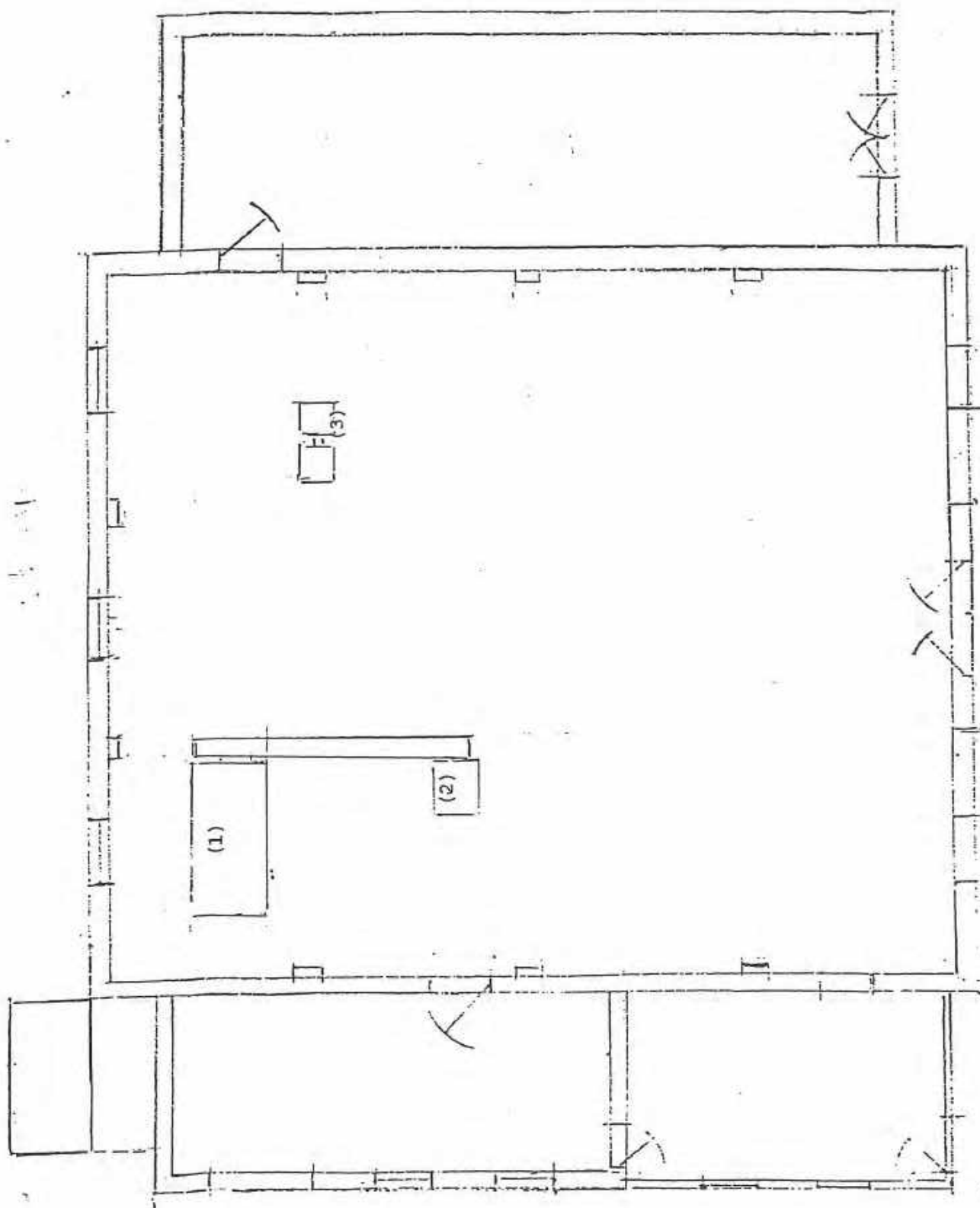
MACHINERY LAYOUTS (INDICATIVE).

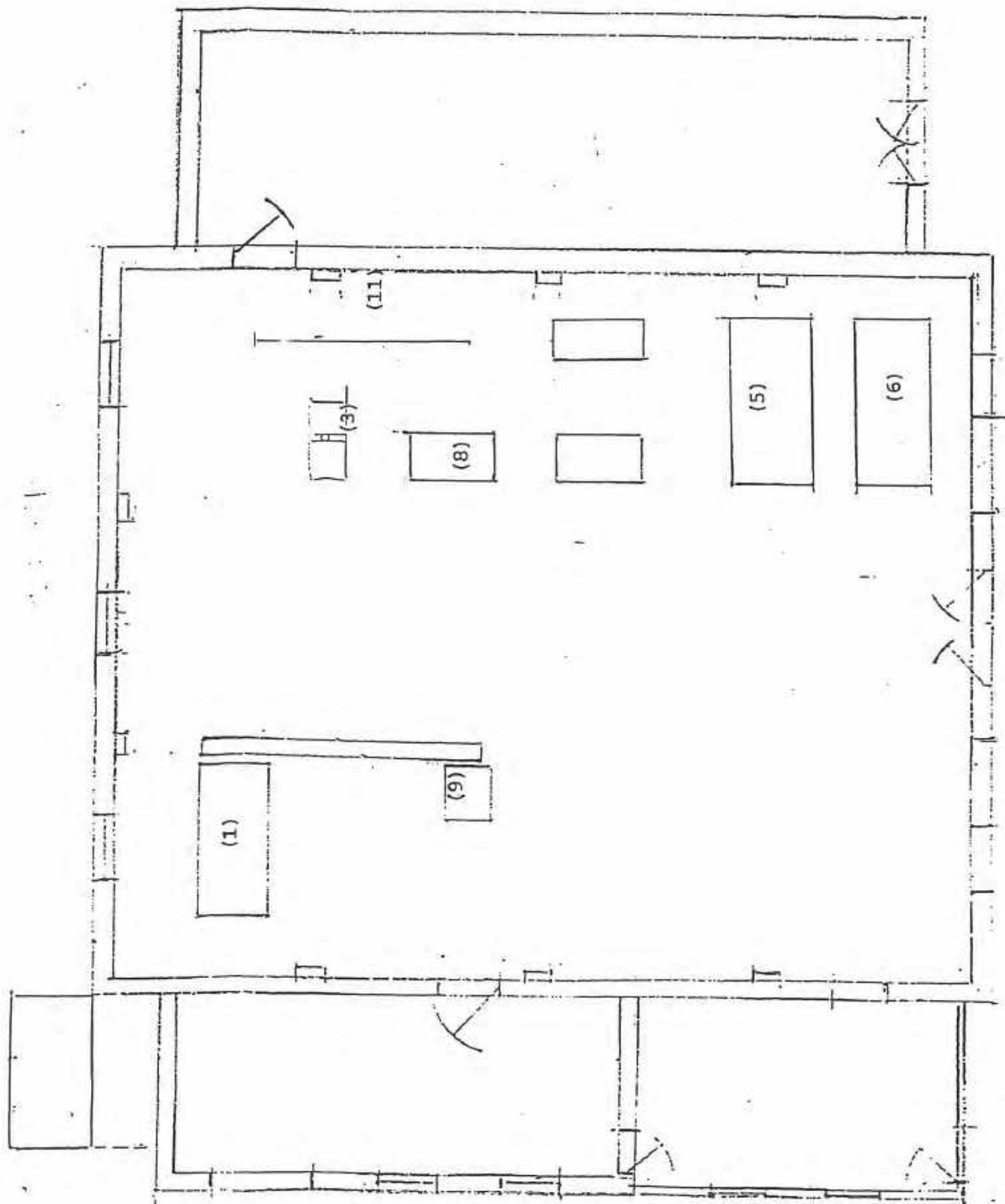
Note :- Drawings of equipment layouts prior to 1946 have been constructed from photographic evidence and the limited information available from newspaper articles. The position of the transmitters in 1946 have been reproduced from a sketch prepared from memory by Mr. Trigwell. The transmitters in 1962 are taken from photographs and as indicated by Mr. F. James. There are a number of items of plant in the earlier drawings for which it is not possible with present information to be certain of their exact function. At the same time we have no indication of the placement of other items, e.g. the Chapman Pup. The equipment layouts have been prepared as accurately as possible in the circumstances. They are valuable in that they enable the equipment changes over the years to be appreciated.

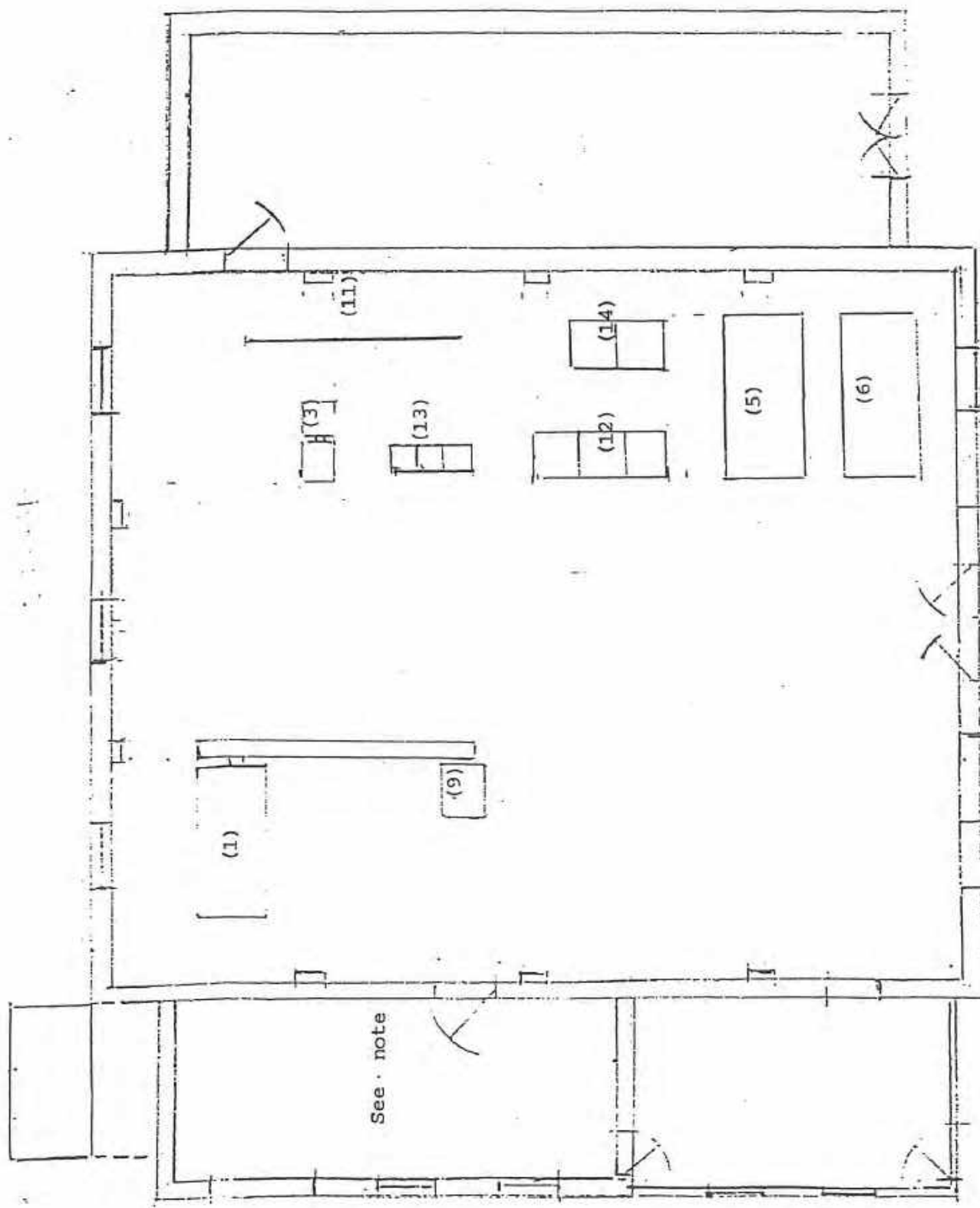
The placement of equipment and sizes of equipment are indicative only and cannot be scaled.

LEGEND TO EQUIPMENT IN ENGINE HOUSE
AND STORE

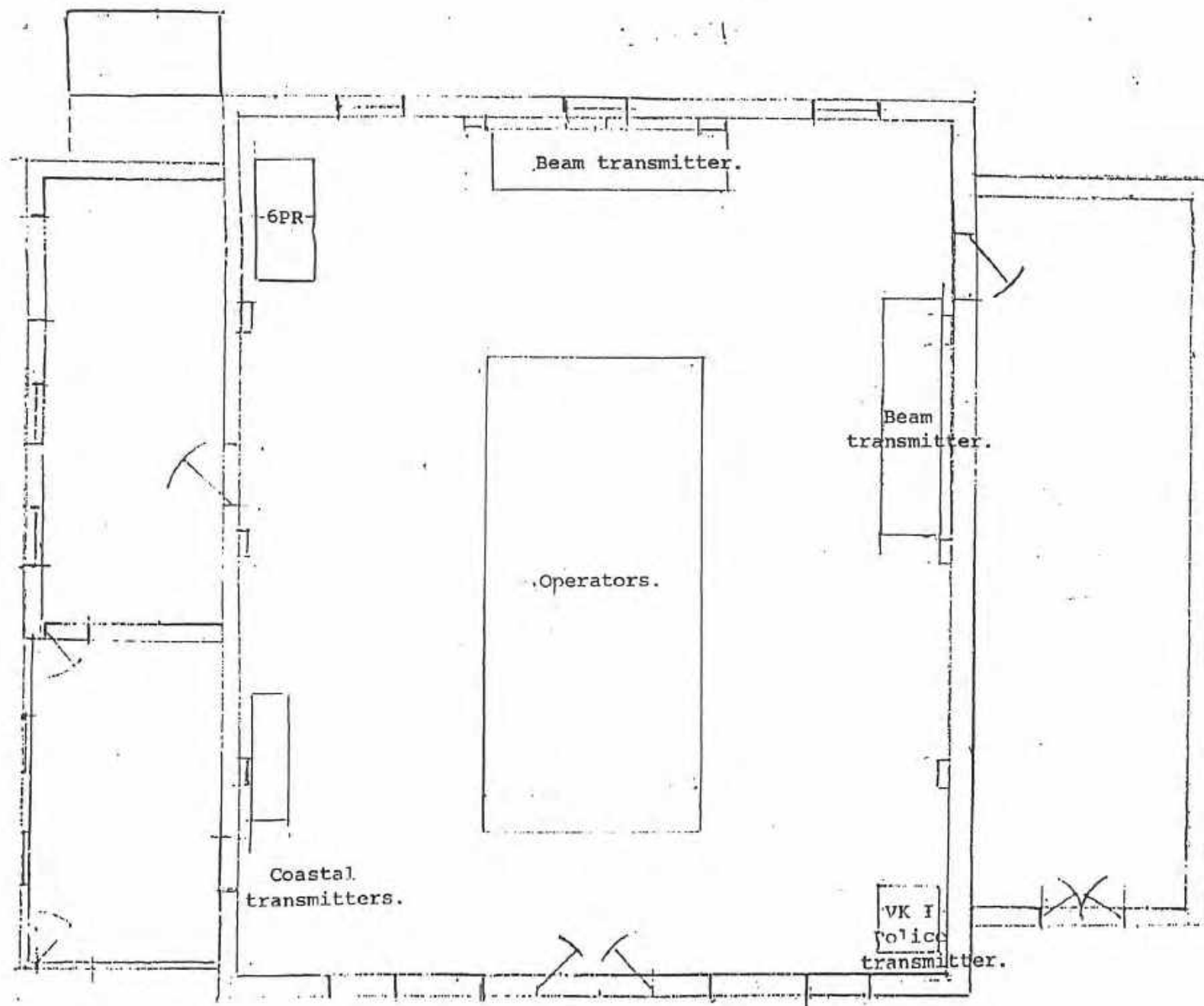
- (1). 75 Hp. Gardner semi-diesel engine.
- (2). 500 cycle alternator.
- (3). D.C. engine driven generator.
- (4). Poulsen - arc transmitter.
- (5). 60 Kw. Motor - Generator.
- (6). 60 Kw. Motor - Generator.
- (7). 20 Kw. Motor - Generator.
- (8). Motor - alternator (2), 500 cycle.
- (9). Standard frequency alternator. Emerg. supply.
- (10). Motor - Generator, battery charging.
- (11). Switchboard.
- (12). Motor - Generator set, C.R.S. Radio.
- (13). Motor - Generator set, Police.
- (14). Motor - Generator set, Short wave auxiliary.
- (15). Fordson Emergency Power set. Removed to back store 1942.
- (16). Blackstone Emergency Power set.

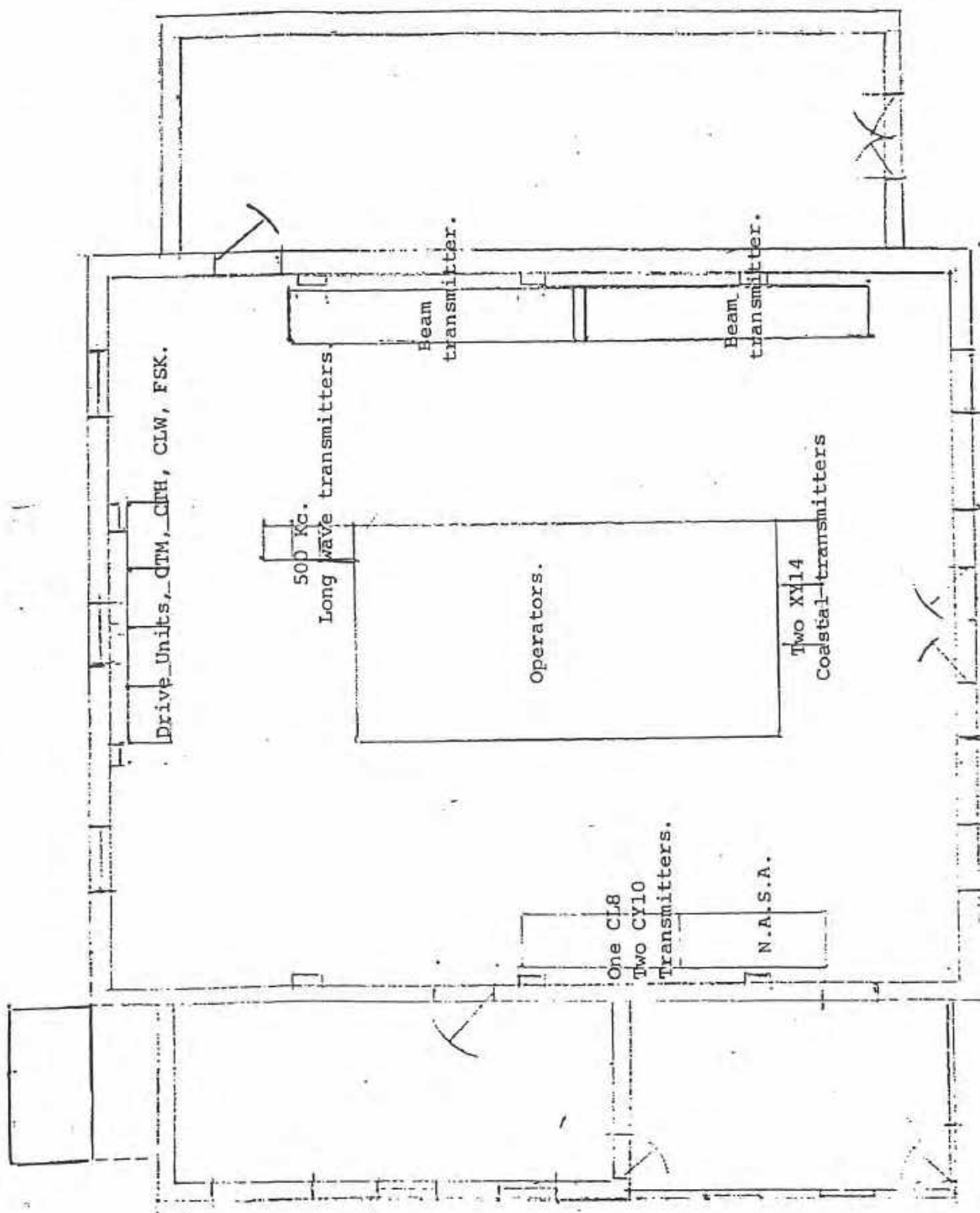






Note :- Fordson Generating Sst removed
from this room 1942.



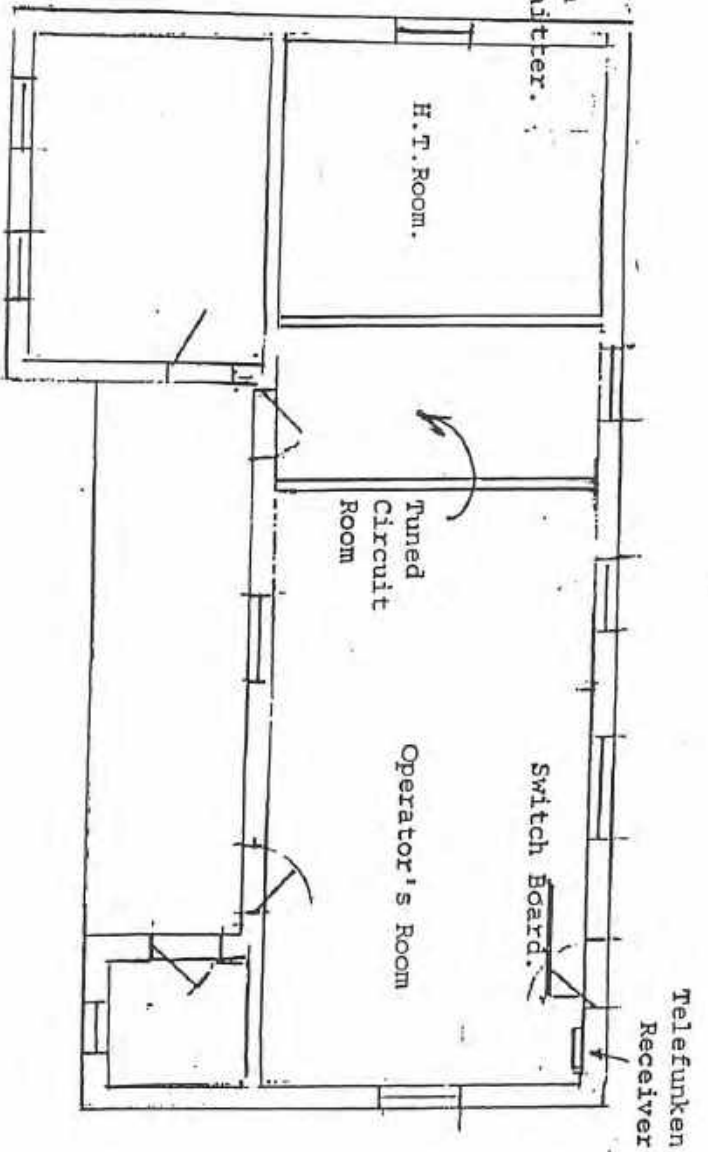


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OPERATOR'S HOUSE

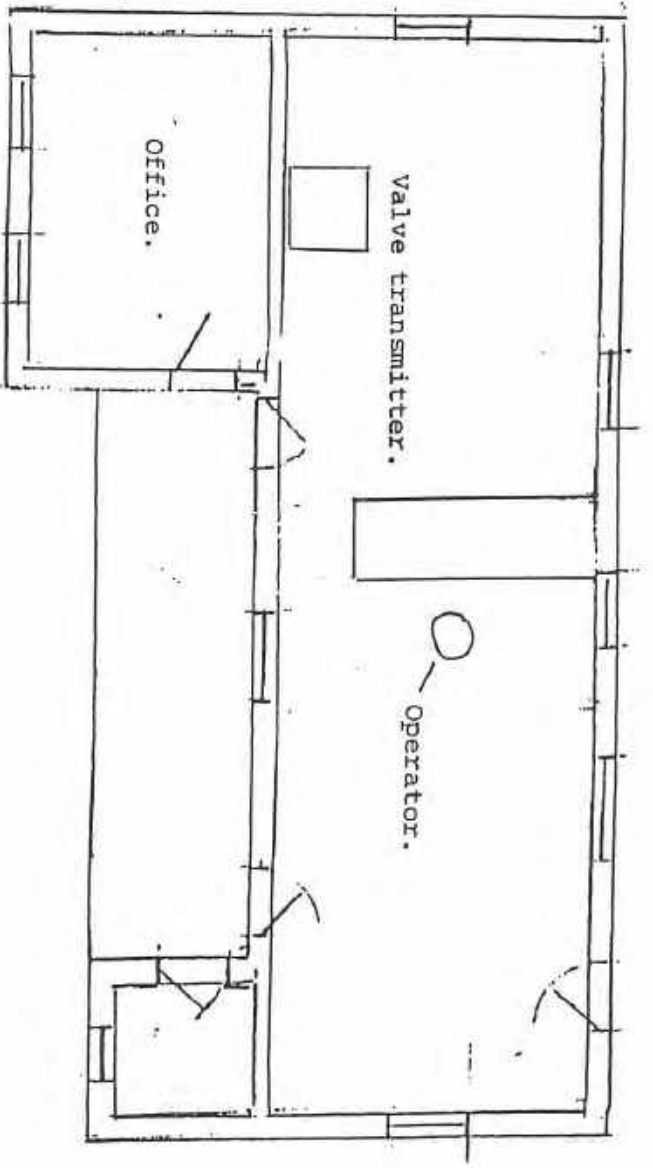
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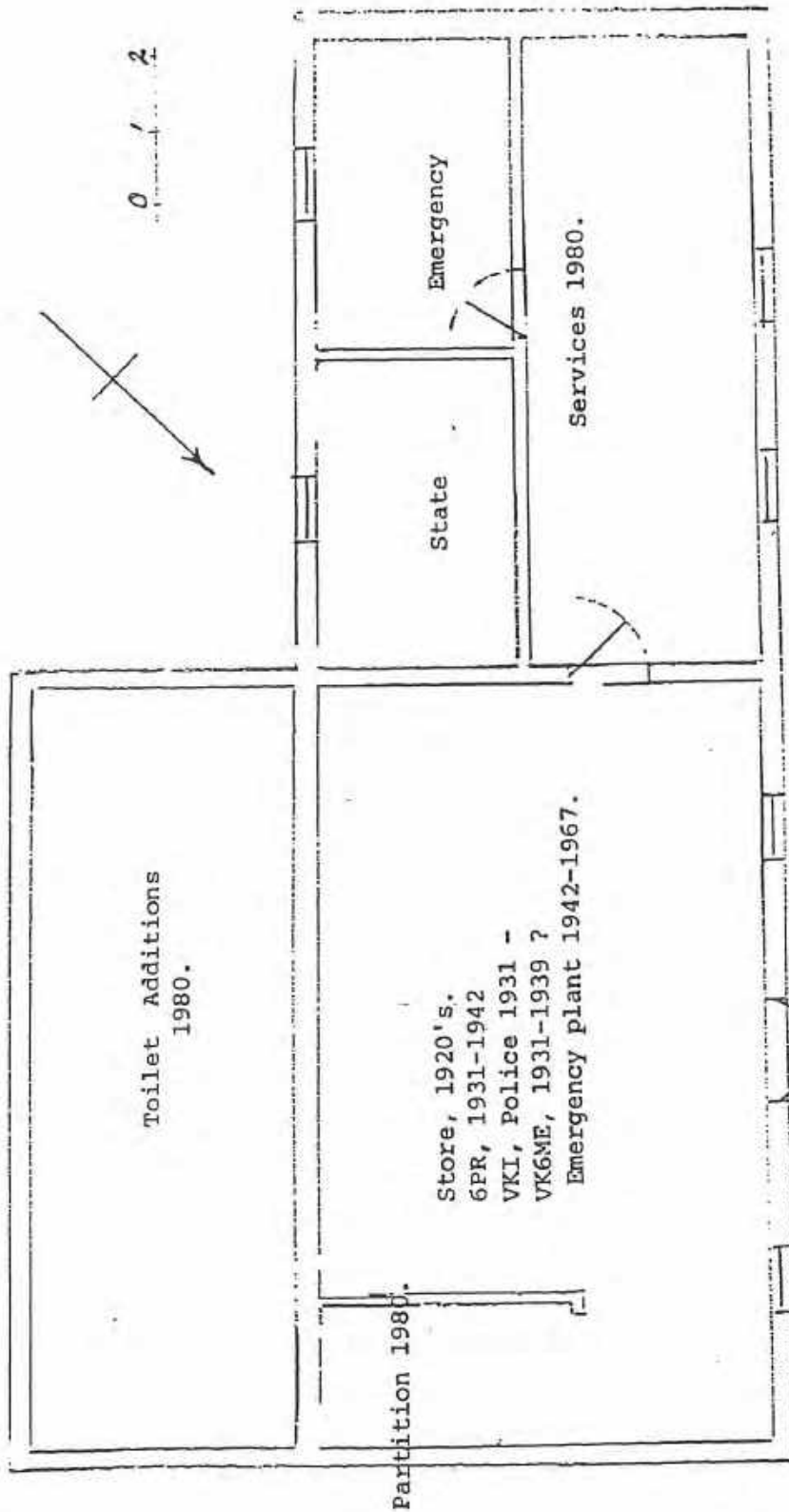
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1931

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STORE.

"ENGINEERING"

Volume XCII. July - December 1911. Pages 335, 336, 337.
Recent developments in Radio-Telegraphy.

The article covers, the growth of shipping equipped with wireless sets, interference and recent attempts to cope with it by sharper tuning and the sending of signals of different musical pitch. It includes details of the transmitters and receivers in common use and has relevance to the Telefunken installation at Applecross.

Volume XCIV. July - December 1912.

Page 315. Paper by Professor Fleming. Mention of his diode valve. Discussion on the bending of radio waves around the surface of the earth.

Page 715. Points of note. On the question of wavelength there was no question that long waves were more suitable for long distance transmissions. The Nauen aerial was of an umbrella form 200 metres high. The recent solutions of the problem of the aerial had shown changes in attempts to make the apparatus more suitable for the long wave lengths now in use, and in attempts to give such a shape that the radiation should be stronger in one direction than in the other. The first of these changes had involved an increase in the height of the aerial, and an increase of the capacity of the aerial formed by the upper part and earth. ... the Nauen aerial was of an umbrella form 200 metres high. The directive aerials of the Marconi type consisted of a comparatively short vertical part and a comparatively longer horizontal part.

The Poulsen system ... considerable progress had been made. ... had not come into commercial use in this country.

... More than 100 words per minute had been transmitted by this system A number of commercial stations had been opened on the west coast of the United States etc.

Page 369. Discourse by Fleming on the various detectors in use and on mechanism of the transmission of wireless waves.

Volume XCVII. Pages 125 - 126. Article on the German stations in the Pacific. Stations were at Uap (Yap), the Carolines, and New Guinea. Umbrella antennae 120 metres high, 60 horse power motor alternator 500 cycles, 25-30 Kw. output. (They sound a perfect copy of the Applecross and Pennant Hills arrangements. This would support the article in the West Australian of 1922 referring to an umbrella aerial at the top of the mast.)

Page 566. The Imperial Scheme. There was no mention of Australia. Maybe Pennant Hills or Applecross were expected to be able to communicate with Singapore.

Volume C. July - December 1915. Capacity of aerials of the umbrella type.

Volume C11. July - December 1916. Anyone who had used the Poulsen arc would appreciate. Generally the arc would run for 1/4 hour and then start jumping all over the place, making it necessary to take out and turn the carbon in the hope it would then run for another 1/4 hour. (One would imagine that turning the carbon would involve turning in a lathe or in a giant pencil sharpener).

Sequence of reports in the following publications.

- (M). All the News in a Flash. John Moynihan.
- (C). A City for All Seasons.
- (W.A.). The West Australian.
- (E.A.). Electronics Australia. 50 years anniversary issue.
April 1989. Articles by Philip Geeves, O.A.M.

(E.A.) The growing coolness of the British Post Office towards its imagined rival, the Marconi Company, was reflected in official Australian attitudes. Nor was the Government willing to adopt any other system, even though submissions were received from various international wireless firms, including Telefunken, Lodge - Muirhead, De Forest and Shoemaker. Australia's indecision was certainly not helped by the Admiralty recommending the Marconi's system, the same system which the British Post Office consistently opposed !

1903 Lloyds of London had thoughts of wireless on Rottnest.(M).

1906 Lloyds to Ftle. Harbour Trust "thought there may be some advantages of wireless telegraphy on Rottnest". F.H.T. corresponded with P.M.G. office in Melbourne and were told "the Minister will communicate with Lloyds if he decides to take up the offer".(M).

1909 F.H.T. approached the C.S.O re wireless on Rottnest. Reply to the effect that the Commonwealth should undertake the work.(M).

1909 Tired of waiting for the British government to decide to whom to award the contract for Britain and the Colonies, Australia opted to go it alone. Janet Wainwright. West Australian.

1909 Imperial Press conference in London. An imperial system of wireless telegraphy was advocated including a station about Perth.(M).

1909 Commonwealth gave notice giving serious consideration to setting up Coastal wireless stations with Fremantle high on the list.(M).

1909 inter - Imperial Conference held in Melbourne Dec. at which the future provision of wireless communications in Australia and the Pacific islands was discussed. Australia undertook to build two land stations, one in Sydney and the other near Fremantle etc.(E.A.).

1910 Five tenders received. Marconi 19,020 pounds, Australasian Wireless Limited 4,150 pounds each. Australasian Wireless Limited had hurriedly acquired the rights to the Telefunken "singing spark" system. The equipment for these 25 kw quenched spark stations was shipped from Germany and erected under the supervision of Telefunken engineers.(E.A.).

The power for each station was supplied by 60 hp Gardiner engines driving 500 cycle alternators.(E.A.).

(Telefunken was subsidised by the German Government in order to get the contract. Hence the substantial difference in tender prices. Tom Berg V.H.F.Soc.).

1911 11 hectare site purchased.(C).

1911 Joseph Murray Johnson sent from Sydney by wireless company to install electrical equipment.(C).

13/7/1911 (W.A. 7.7) Wireless Telegraphy. Effect of the Parker Judgement. Re infringement of the Marconi patents. Deputy Prime Minister Mr. Hughes referred to the effect of the recent judgement on the commonwealth stations. The positions with respect to Fremantle and Sydney stations was clear. The Austrasian Wireless Co. system which was working under the Telefunken system, guaranteed the Commonwealth against loss or action, and in addition the contractors had to give an efficient working plant. Port Moresby and Thursday Island plants had been postponed as the Commonwealth could not go on if it knew it was infringing the Marconi patents. The possibility of further action was imminent.

24/7/1911 (W.A. 3.3) Letter to paper by J.H.Wilbur. Rather long. Refreshing to learn a wireless station was being built. He questioned why a Telefunken station when 90 % of shipping plus Australian warships have Marconi equipment. Why was the contract increased by 2,000 pounds to shift the station in Sydney.

6/9/1911 (W.A. 11.1) Arrival of Commonwealth expert. Missing.

5/12/1911 (W.A. 7.5) Telefunken has advised the Australasian Company that the action by the Marconi Company against Siemens had been withdrawn. The Post Master General, Mr Fraser, did not know what effect this would have on difficulties which appeared to have been raised by British courts with respect to the other Australian stations. As soon as the matter was cleared up the Commonwealth would go ahead setting up its own 500 mile stations around Australia. 1911 -1913. Work on erection of station at Applecross in progress. Public Works Department, Telefunken, and Australasian Wireless Company. Small village at foot of hill. Village survived due to operating and maintenance personnel. Several houses remaining in 1988.(C). Height of mast 122 metres, weight 51 tonnes. (Melville Council planning document).

1912. Johnson constructed crystal detector to substitute for the detector in the supplied equipment in order to meet the specified range.(C).

24/1/1912. W.A. WIRELESS TELEGRAPHY. SYDNEY AND FREMANTLE STATIONS, APPOINTMENT OF OFFICERS. In view of the completion in the near future of high power wireless stations at Sydney and Fremantle, the Federal Government has decided that no time should be lost in making the appointments of the officers who are to manage these undertakings. etc. Mr L.E. Tilney, a telegraphist in the New South Wales Postal Department has been appointed to the position of officer in charge of the Fremantle Wireless Station with an increase in salary from 285 pounds to 310 pounds a year. These officers have for some time been undergoing training in Wireless Telegraphy.

1912. Jan 29 W.A. 8.5 VIA WIRELESS. THE PERTH STATION. Nearing completion. Within a month or two the first official wireless telegraph station in Australia will be opened to the public. The Commonwealth has not lagged far behind other

countries in the installation of this advanced means of message transit and now that the start has been made it will not be long before stations at different points along the coast will bring the long Australian seaboard into touch with all steamers ploughing the deep not hundreds but thousands of miles from its shores. During the last few weeks citizens have watched with interest the erection of the immense steel tower, rising nearly 400 feet from the ground which has been constructed at Applecross to catch and transmit messages. From the Swan foreshores the long black streak looks like an immense flagpole thrust up into the sky at the mercy of the first puff of wind which might gambol along to blow it down, but the extensive concrete foundations and stout steel guys which are revealed on a closer inspection engender confidence in its ability to weather the roughest storm. It is situated on a large block of land nearly 100 acres in extent, between Applecross and the head of Frenchmans Bay. One side of the block is bounded by the Perth - Fremantle road and a metalled road of easy gradient had been formed within the reserve to the top of the hill which is about 150 feet above river level. The site is an ideal one for the purpose. It is about 5 miles from Fremantle and although from Perth its appearance suggests that it is only a few hundred yards from the opposite shore, the distance by road is 7 1/2 miles . as the crow flies however five miles being the space between the pole and the Central Post Office.

Large numbers of interested visitors have watched the progress of its construction and speculation has been rife regarding the distance the station will be able to flash messages by sea and land. The erection of the tower and the installation of the necessary plant are in the hands of the Australian Wireless Company under contract with the Federal Government but all other works in foundations , earthworks, roads and buildings are being carried out for the Commonwealth authorities by the Architectural Division of the Public Works Department of Western Australia of which Mr. Hillson Beasley is the head. The works are now approaching completion and it is expected that the installation will be in full working order by the middle of March.

The main mast or tower made of latticed steel is 394 feet high and the concrete beds for this as well as for the steel guy anchorages have been constructed by the State Public Works Department. The tower and guys are insulated by strong glass discs which in the case of the tower support a weight of over 120 tons . Close to the tower are placed the offices for the operators and the engine room with its battery and other machinery. An area 30 chains in diameter has been set apart for the receiving zone and outside of this are detached quarters for the superintendent and head fitter and a block for the six single men who will be required as operators. The buildings are of red brick with half timbered gables and tiled roofs. Every provision has been made for the comfort of the men who will in turn be liable to be called on at any moment during the day or night to send and receive messages. When a steamer gets into communication with the Perth station waves, a bell automatically warns the

operator, one of whom always be on duty. The whole block is to be enclosed with a six ft. picket fence with large entrance gates from the Fremantle road.

The value of the station both for defence purposes and for assistance in other directions can hardly be over estimated. When it is in working order the arrival of mail boats from Colombo will be followed practically to the minute. Steamers will be picked up around the coast all the way from Port Adelaide and any craft in distress in the Indian and Southern Oceans installed with a wireless plant will be enabled to secure help from Fremantle, provided it is within the range covered by Perth wireless speech. The machinery is so well forward that preliminary tests are now being made by the chief engineer for the Wireless Company Mr. Moenay and messages have been flashed across the waves to boats a long way out by means of temporary wires. Under favorable conditions it is expected that Cocos Island in the Indian Ocean will be picked up. The guaranteed distance to which messages will be flashed is 1,250 miles, but when conditions are good expected that the radius may be increased to 2,000 miles and possibly as far as Pennant Hills, Sydney, where a corresponding station is being erected. Already a private station at the Hotel Australia, Sydney, transmits messages to Fiji and other places, and is generally in touch with at least half a dozen boats around the Eastern Australian coast.

Most interest centres of course in the charges that will be made. It is probable that the minimum rate will be ten pence per word including ships charges (6p. for sending and 4p. for receiving) but that rate does not include the cost of repeating to other stations when messages have reached Perth. They will be forwarded from Perth to their destination at their ordinary telegraphic rates. A minimum of 10 words constitutes a message so that 8 shillings and 4 pence will be the lowest possible charge to those who propose to mark their messages by wireless. Elsewhere the experience has been that the new system is popular for commercial purposes but accepting large numbers of business messages will mean that communications cannot be received from overseas while the line is otherwise engaged. This however will adjust itself. When a station is erected at Adelaide as well as at Perth, messages will be sent to that point first for Sydney and further afield, instead of speaking direct. The construction of stations in the eastern capitals will link up the whole of the Australian coast and quite apart from the military aspect, it constitutes a wonderful protection to human life at sea. As Fremantle is the first port of call for steamers from the old world, the Perth station will probably become the most important unit in the system, and it is no wonder that citizens feel a pardonable pride in the steel mast which stands out so prominently on the skyline at Applecross.

2/5/1912. W.A. "No," said the Prime Minister (Mr. Fisher) in reply to a question today. "the reported acceptance by the Imperial Post Master General of the terms of the Marconi Company for the construction of long distance wireless stations does not in any way bind Australia."

It was added that the British Minister was acting on behalf of the British Government and the Governments of the dominions. The terms of the agreement provide that the Marconi Company should be paid 60,000 pounds for each station, exclusive of site, foundations for machinery, and buildings, and should receive 10 % of the gross receipts of all long distance stations for a period of 28 years. Mr. Fisher said that a communication had been received from the Imperial Government on the subject, and he was astonished to see the statements that had appeared in the press. The resolution passed at the Imperial Conference was merely affirming the desirability of a state-owned wireless system being established within the Empire. Certainly the Commonwealth was not going to pay 60,000 pounds for any wireless station, at the present time at any rate.

"We have our own system, and we are going ahead with it." Mr. Fisher said in emphatic tones. "We must have wireless facilities, and we do not intend to wait three or four years for big power stations while smaller ones for shipping and other purposes are such an urgent necessity. If we are indebted to anybody for any features of the system we have adopted, we will gladly pay a fair thing, but we are going right on."

26/9/1912 (W.A. 7.7) Mr Basillie. Commonwealth expert. In Perth to carry out tests at Applecross which should not extend for more than a week. Before the contract was deemed to be complete the station would have to demonstrate that ethergrams could be sent by day a distance of 1,250 miles. Wireless stations are to be established at Esperance, Roebourne, Geraldton, and Wyndham before the end of the financial year. Subsequently at Broome and Eucla. Six weeks of work are required to establish each station.

30/9/1912 Opening of the radio station on Wireless Hill. (M).
1/10/1912 (W.A.) Report of opening of station. Apparently no official ceremony. Taken over on behalf of Commonwealth by Mr. Basillie. A lot on the initial rates. Messages to be left at any telegraph office. Charge 6 pence per word for the land charge and 4 pence per word for the wireless. To contact any ship fitted with wireless within 1,000 miles of Fremantle.

24/1/1913 (W.A. 7.2) Report on an inquiry into the contract between the Imperial Government (Britain) and the Marconi Company. One submission to the effect that the Government had placed itself in the hands of patent exploiters. Sir Henry Norman advised of refinements since the original Marconi developments. Telefunken - quenched spark. Marconi replied with the disc dischargers. Not as smooth as the quenched spark. Mr Duddel was using electrodes as in an arc lamp. Mr Poulsen had put the arc in a hydrogen atmosphere. Pedersen had developed a high speed receiving and transmitting apparatus. Dr Goldsmidt had designed a 60,000 cycle per second alternator.

1913 Amalgamated Wireless (Australasia) formed as a result of a patent war between Marconi and Telefunken and an announcement by the Commonwealth that all future coastal radio stations would be supplied by Father Shaw's radio workshop in Randwick to the circuitry of the P.M.G's Dept.

A.W.A. formed to represent both Telefunken and Marconi.(E.A.).

1914 At the start of the war there were the two 25 kw Telefunken stations and 18 only 5 kw sets to the Department,s design around the coast.(E.A.).

1914 - 1915 Navy considered it should have overall control of war time wireless. Early in the war a Post Office operator sent out an uncoded message regarding a troop carrier. Control of wireless telegraphy throughout the nation passed to the navy during the latter half of 1915. (This obviously included Applecross.) (E.A.).

1914 -1915 During the early part of the war. Australia's coastal stations at Pennant Hills, Applecross, and Townsville were equipped with valve receivers for the first time, thus making possible the interception of European transmissions, especially from the powerful German station at Nauen, near Berlin. German propaganda messages were copied daily in Australia.(E.A.).

1914 - 1918 Station picked up German propaganda from Naun in Germany.(W.A.2/5/1984).

1915 received signal from Cocos giving the position of the German warship Emden enabling its subsequent destruction. Janet Wainwright. West Australian.

1916 - 1918 Marconi experimental long wave transmissions to Fisk in Australia (14,000) metres. In 1918 Aust. P.M. Billy Hughes sent message direct by wireless to Australia. This presumably guided Hughes in his subsequent efforts for a direct link between Britain and Australia.

14/9/1920 (W.A. 6.7) During the next few days control of the various wireless stations throughout Australia will pass to the Post Master General's Department from the Naval Department. The Naval Department will retain control of two high power stations for its own use or else erect two new stations. It is considered more probable the Naval Dept. will retain the stations at Sydney and Perth , these being considered the two most highly powered stations in Australia.

(E.A.) More than a year after the war ended, wireless was still under Navy control and amateur radio was a wasteland. Not surprisingly there was mounting pressure for the P.M.G. to take it over.

1919 Control of station reverted to the P.M.G's. Department.(C). Wrong ?

4/2/1921 (W.A. 6.3) Imperial wireless scheme. The Imperial authorities have commenced construction of stations in England and Egypt. Other stations will be constructed in Singapore and Australia. Preliminary action is being taken for the selection of a site in Western Australia.

5/2/1921 (W.A. 7.8) Elucidation of the Imperial Wireless Chain. Links of 4,000 miles would require arc transmission. A B.P.O. service between England and Egypt would shortly be in service. No link in the Empire chain would be greater than 2,000 miles . The proposal is to use thermionic valves in the transmitters which is in line of future developments and would cost less than using arc transmitters. Wireless stations would be located in England, near Cairo, Singapore, Hong Kong, and on the north coast of the West of Australia.

15/2/1921 (W.A. 6.7) Statement by the Post Master General re the Imperial Wireless scheme. Preliminary action was being taken for the selection of a site in Western Australia.
2/3/1921 (W.A. 6.4) Increasing value in the use of wireless telegraphy, particularly the newly developed Continuous wave equipment with which the Marconi Company is fitting out important vessels. This is being demonstrated by the work of the wireless station at Applecross. Spoke to the S.S.Aeneas when 3,570 miles distance. 3,570 miles is a record for a ship with C.W. on the Australian coast.
1921 Operating range of Applecross had been significantly extended. Signals exchanged with the S.S.Aeneas daily to within 1 or 2 days steaming of Durban. This 9,000 km. transmission a record for all Australian coastal stations at the time.(C).(W.A.2/3/1921). 9,000 km is a bit excessive ?
9/4/1921 (W.A. 8.8) Report of a meeting of the Wireless Institute of Australia. In America and England, amateurs are encouraged in every way to experiment. In Australia receiving licenses only are permitted. Members to fly W.I.A. pennant on their aerial.
1921 Britain had been proposing a chain of radio relay stations throughout the empire. At the Imperial Conference, Hughes informed Britain he was not prepared to settle for less than a direct radio link with Britain. The Commonwealth commissioned A.W.A. to set up a direct service to England, and as an expression of faith in the future of radio, acquired a major equity in the company, a partnership that endured for almost 30 years.(E.A.).
A.W.A. was to set up a high powered station in N.S.W. or Victoria and take over all other Australian stations as feeder stations and re equip. The high power station was originally proposed to be in Western Australia however due to the threat that it could be cut off from the rest of Australia in the event of war and that 90 % of the traffic originated in the Eastern States, that proposal was not proceeded with.

Nov 21. 8.6 Further details available re high power radio station to be built between Sydney and Melbourne. Originally it was to be in built in W.A. but shifted because it could be cut off by war and because 90% of the traffic would be with the Eastern States. An identical station to be built in England. The British station to go ahead immediately the Australian Parliament approve the 2,000 mile service radius in accordance with the Norman plan.

Dec.1. 9.5 The Radio Communication Company said it could establish a high power station in Australia and bring the feeder stations up to scratch for much less than the 500,000 pounds proposed by A.W.A. They will also establish at their own cost a matching station in the U.K. Cost of operation will be 20% less than that of A.W.A.

Dec.2. 7.7 A.W.A.'s. proposals for two high powered stations in Victoria or New South Wales and feeder stations.

Dec 7. 7.8 Alternative proposals for setting up a high power station by the Radio Communication Company. A company to be set up with an issued capital of 700,000 pounds. The Commonwealth to own 50% plus 1 share. Three directors to be

nominated by the commonwealth government and three to be nominated by the company.

1922.

Mar. 30. 7.6 A.W.A. said at least two years would elapse before the service commenced. A.W.A. were empowered to negotiate for stations in England and Canada within a period of six months. Each station would be three times as powerful as any European station today. Cost of contract 1,000,000 pounds. A.W.A. to take over all existing Australian stations as feeder stations and will re equip.

April. 5. 6.6 The Radio communication Company who were not recommended alleged extravagance in the agreement. Each station was proposed to have 24 towers each 800 feet high. One can easily see how proposals are to cost 1,000,000 pounds. In comparison the British Wireless Company at Bordeaux have 8 towers each 800 feet high.

1922. July 22. W.A. Our Wireless Station. Visit to Applecross. Past, present and future. When the visitor to the Applecross Wireless Station is informed that the tick tick ticking to which he is invited to listen is caused by someone in Berlin, or Petrograd, he is apt to say, "Marvellous". And yet when one comes to think of it, to send messages without wires is not in itself a greater marvel than to send them by means of wires: a vibration travelling along the ether is not more miraculous than a vibration sent along a thread of copper. The difference is that we have in the course of a hundred years or so grown so accustomed to sending a wire that we have forgotten how wonderful it is, we take it for granted almost as completely as we take for granted the fact that the human throat is capable of setting the air upon a state of rapid vibration, and that these vibrations impinging on a receiver called the human ear give rise to effects which make civilisation possible. Wireless telegraphy working by electro magnetic waves in the ether is closely analogous to human speech working by sound waves in the air: the one is as great a miracle as the other. Already there are signs that we shall soon take wireless for granted and cease to marvel at it. The earlier systems of wireless are now spoken of by the experts as quite obsolete and inadequate: what we thought of a dozen years ago, as an almost incredible triumph of man over matter, is beginning to be spoken of with something like contempt, as a mere crude beginning good enough in its way, but hopelessly out of date. We are on THE EVE OF GREAT DEVELOPMENTS in Wireless communication. The day is not far distant when Australia will be able to talk directly with every other civilised country in the world.

To visit the Applecross station as a representative of the "West Australian" visited it yesterday is to gain a new sense of the greatness of the human brain, the brain which found the key to this secret chamber of nature's wonder house. The station stands on an eminence overlooking Lucky Bay: from the top the great mast soars into the air to a height of 396 ft. It was erected in 1911 by a German firm (the Telefunken Co), which had sent in a lower tender than the Marconi Co. and secured from the Commonwealth Government the contract for this station and an exactly similar one at

Pennant Hills, New South Wales. The mast which is built of mild german steel weight 120 tons. It is fashioned on the lattice work principle, and is triangular in build, working on a ball and socket pivot, which allows for a certain amount of movement. The whole huge structure rests on insulators, three tiers of them, made of glass and separated from one another by sheets of lead. It gives one a new respect for glass to learn that these insulators carry the whole weight of the mast and something more for when the pull of six great guys or stays is counted in, the total pressure on the insulators is not less than 150 tons. The stays are attached to the mast by glass insulators, and to the earth (with insulators again) by three massive concrete anchor-boxes each weighing about 200 tons. The mast itself plants its glass feet on a foundation of concrete 16 feet deep. It may be mentioned that during the war the anchor boxes had to be CLOSELY GUARDED by day and night, for if one of the stays had been cut the whole mast might easily have collapsed. The station is full of reminders that it was erected in pre war days : all the parts of the mast and much of the operating equipment were brought from Germany and assembled here.

From a point on the mast there radiate, like the ribs of a vast umbrella which the wind has denuded of their covering, 24 long wave - aerials, each equipped with 18 porcelain insulators. Nearer the earth the mast is hung with telefunken ship-type aerials and cage aerials, for short wave work.

There is also in course of construction at Applecross A DIRECTIVE AERIAL mainly for the purpose of finding out from which direction comes the strongest flow of static electricity. (A fortune awaits the man who can eliminate from the atmosphere these troublesome " X's " as they are called, which interfere with wireless signals. Loop aerials or "wireless compasses" have been constructed on the shores of the English Channel and on the American coast for the benefit of shipping. During the war they were used extensively at the front for locating enemy wireless depots. The staff consists of five operators, two mechanics, and a labourer. These men under the new arrangement are no longer the employees of the Commonwealth Government, but of Amalgamated Wireless Ltd. (Australasia), a company in which the Government is to hold a controlling number of shares. Mr. Trim, the station master, spent several years at Wyndham during the war in the service of the Navy Department : and in the latter stages of the war he was naval radio inspector at Melbourne. He has served on wireless stations at Sydney, Geraldton, and Esperance, and is not a stranger to Applecross having been supervising mechanic when the station was erected in 1911. He returned in April last to manage the station he helped to build. In Mr. Trim's opinion, Applecross compares favourably with any other Australian station in the matter both of receiving and transmitting : and he is full of admiration for the efficiency of his staff. Applecross is the control station for Geraldton and Esperance, and is OPEN DAY AND NIGHT.

All through the night there is one operator on duty. In the day time Mr Trim himself, two operators, two mechanics and a labourer are on duty continuously.

The only objection to Applecross as a site for a wireless station appears to be the sandy soil, which becomes excessively dry. To meet this defect a network of thousands of lengths of copper wire has been laid a few inches under the surface. This is technically known as "counterpoise" and its function is to improve the conductivity of the earth. THE OPERATING EXPENSES amount to 220 pounds a month. Of this 18 pounds is paid for electric current of which 2,700 units per month are consumed for operating purposes alone, apart from what is required for lighting the station.

A breakdown in the supply of current from Perth would not seriously interfere with the working of the station, which possesses a power house of its own containing among other machinery, two motor generators, an alternator, and a 50 hp. motor all made by the Weymouth Co. of Melbourne. It is a relief to see part of the equipment which is not German in origin.

DURING THE NIGHT the station can receive messages from any other station in the world, and can transmit messages to any high power station, but it depends on the condition of the atmosphere whether the messages transmitted will be received by the other stations. In the day time messages may be received from anywhere but the transmitting power is more doubtful than at night. The station has on occasion to get some touch with ships at sea 4,000 miles away,

but has not as yet sent signals farther than this.

Eventually Mr. Trim thinks, when more modern apparatus is installed, all messages between Australia and South Africa will pass through Applecross. He expects that in the near future the station will be equipped with a set of up-to-date 35 kilowatt transmitters, which will make possible a continuous direct traffic with South Africa during daylight. Our representative was shown THE OPERATING ROOM with their telefunken transmitting system, their high power and low power transformers, the receiving room where he was privileged to listen to signals passing between the S.S. Minderoo and Geraldton: and the subsidiary buildings, which were erected, not by the Germans but by the State Public Works Department. He was shown an elaborate and complicated arrangement of cylinders and coils and fans and switchboards and objects which looked like nothing he had ever seen before, and he was accompanied by Mr. Trim who kindly supplied him with technical names for everything so that his mind was bewildered and benumbed under a cascade of strange barbaric words. The man who is not a radio expert can see only that the apparatus is very intricate.

But he can appreciate the work done by this intricate apparatus and can understand how beneficial an agent human genius has put at the service of the world.

1922 Amalgamated Wireless Australasia assumed responsibility for all Australia's external radio telegraphic communications.(C). (This included Applecross).

7/3/1923 (W.A. 9.4) Empire Wireless Chain. The British Government considered there should be a government wireless station in Great Britain capable of communicating with the

Facsimile:

Date: 17 October 1994

Total no. pages
(including this one)



To: Richard Usher, Executive Officer, Western Australia Division

Fax number: Auto

File: 3/6/93

From: Robert Breen, Associate Director Engineering

Subject: SUPPLY OF PLAQUE FOR PERTH WIRELESS STATION



The
Institution
of Engineers,
Australia

NATIONAL OFFICE

Richard,

The supplier has advised this morning that the Perth Wireless Station plaque was despatched from its premises in Melbourne on Friday. Delivery to you can be expected today or tomorrow.

Kind regards,

R. Breen

Robert Breen
Associate Director Engineering

Chairman, National Committee on Engineering Heritage

Auto
23 - 1001

17/10 '94 10:28 06 273 2358

IEAUST PUBS

001

ACTIVITY REPORT

TRANSMISSION OK

TRANSACTION #	0824
CONNECTION TEL	094203174
CONNECTION ID	A MOULDS
START TIME	17/10 10:27
USAGE TIME	00'47
PAGES	1

Note of Action

As WA Division's request I returned the only copy of the book on the wireless station to them for use in compiling paperwork for the unveiling ceremony. I requested a copy be returned for the file.

B. 12.10.94

● To:-

Rob Breen

4 pages

HISTORIC ENGINEERING MARKER NOMINATION

PERTH WIRELESS STATION

The attached documentation is a copy of an advance fax which is unsigned. The original signed proposal is being forwarded by mail and was not available in time for inclusion in this package which is forwarded for urgent attention.

The documents in the mail include a book containing the history of the wireless station which supports the nomination. As it is the only copy available and is to be returned to Western Australia after the completion of the assessment process, it will not be circulated to CPSC members unless specially requested.

Yours expeditious consideration of this submission is requested.



Robert Breen
CPSC Executive Officer

The attached is the only documentation I received re this nomination. It was OK as an advance piece of information to get the plaquing process in motion, BUT DOES NOT CONSTITUTE A PROPER SUBMISSION TO THE USUAL FORMAT AND STANDARD.

We expedited matters as a favour to meet an urgency re ceremony date. Now the urgency has been postponed then a proper submission should be presented.

8 JUL 1994 10:17 FROM 1 E AUST. WA DIVISION TO NATIONAL OFFICE PAGE.003/004

COMMEMORATIVE PLAQUE NOMINATION

To: Commemorative Plaque Sub-Committee
The Institution of Engineers, Australia
11 National Circuit
BARTON ACT 2600

From: Engineering Heritage Panel
W.A. Division

The following work is nominated for an Historic Engineering Marker Award:

Name: Perth Wireless Station

Location: Wireless Hill Park
Almondbury Road,
Ardross
(Crown Reserve 29813 Lat. 32 02'00"S, Long. 115 49'30"E)
Western Australia

Owner: City of Melville
Almondbury Road
Ardross
(PO Box 130
Applecross WA 6153)

In support of the nomination the following information is provided:

Proposed wording on HEM:

PERTH WIRELESS STATION

Eighteen years after Marconi's first radio transmission, the Australian Post Master General's department commissioned this coastal radio station in 1912, being one of five around the continent at that time.

It established the first direct telegraphic communication across Australia and with off-shore shipping.

The original Telefunken 25kw queneched arc long wave transmitter was connected to a 120 metre high guyed aerial.

Between 1922 and its 1967 decommissioning, it linked Australia to the world by radio.

Dedicated by
The Institution of Engineers, Australia. 1994

Justification:

The site is located in the Perth suburb of Ardross adjacent the Canning Highway between the Swan River, 7km to the west and Perth, 8km to the north. The site, called Applecross Wireless Hill Park, is now a public reserve vested in the City of Melville. As a public park, including the Wireless Hill, it is now used for a number of community purposes including a Telecommunications Museum. The site is classified by the National Trust of Australia (WA).

The buildings on the site remain intact and date from the commencement of the station in 1912. The three buildings at the crest of the hill were the operators' building, the engine house and the store. At the bottom of the hill near the Canning Highway are a group of four dwellings which housed the operating and maintenance staff. Also remaining on the site is the central concrete foundation for the 120m mast and the three concrete anchor blocks for the mast guy wires. The only remaining parts of the wireless equipment on display at Wireless Hill are a large antennae coil former and a broken glass insulator disc from the base of the mast.

The buildings, roads and foundation were constructed by the Architectural Division of the Public Works Department of Western Australia. The supply of plant and erection of the 120m mast was undertaken by the Australian Wireless Company. The original wireless equipment was a crystal receiver using local galena ore and a 25kw quenched arc transmitter supplied from Germany by Telefunken. It was powered by a 60hp Gardiner engine driving a 50 cycle alternator.

Operations began under the control of the Postmaster General's Department. The Australian navy took control during World War 1, and installed a 80 KW Poulsen arc transmitter and valve operated receivers. Soon after 1916, power was obtained from the metropolitan supply at 20KV through a 75 KVA transformer to produce 400V. Control returned to the PMG Department in 1920, passing to AWA in 1922, who installed valve transmitters. Generating machinery was removed from the power house building in 1942, and the building became the transmitter hall. The operating staff moved to Bassendean in 1943, where they were placed in a concrete bunker, and returned to Applecross in 1946, when all the transmitting and receiving equipment still remained in the original power house building.

Control of the station moved to the Overseas Telecommunications Commission in 1947, who moved the receiving equipment to Bassendean and the transmitter operators to the old cable station at Mosman Park. Two rhombic antennae were used for the NASA Space Mission communication in 1960, and the 120m mast was replaced by a shorter mast of 46m in 1962. OTC vacated the site in 1967, and control of the site with its buildings passed to the City of Melville. The original transmitter building became the caretaker's residence, and original power house building the Wireless Museum, and the store building a community meeting hall and the control centre for the State Emergency Service.

The Perth Station, with its sister station at Pennant Hills in Sydney, was set up to establish direct wireless telegraphy communication across Australia from 1912. These stations together with smaller coastal stations in Melbourne, Hobart and Brisbane also formed an important link in a network of coastal shipping communications wireless stations established around the Australian coastline just prior to the first World War, and commanded the seaward approach on the western side of the continent. This greatly improved the safety of ships at sea around the Australian coast. The Station took on a larger international role in about 1925, both serving as a feeder for traffic to eastern states international services and for direct wireless links across the Indian Ocean. Additionally, about the same time, AWA installed a 5KW coastal service transmitter for radiograms; equipment for police communication VK-1, and a short wave broadcasting station VK6-ME. Nicholson's Ltd, who were the local agent for AWA, began commercial broadcasting with a 'B' Class transmitter 6PR of 500W in 1931.

Perth Wireless Station commenced operation just sixteen years after Marconi first demonstrated wireless telegraphy from the Post Office in London, sending messages over a distance of about twelve miles. Therefore the Station has an important place in technological history.

The station also has strong associations with important developments in wireless telegraphy and broadcasting in Australia and the development of Amalgamated Wireless Australia (AWA) and the Overseas Telecommunications Commission (OTC). The station was used continuously from 1912 to 1967 as the main coastal radio communications centre for the State. In the 1920's it became a feeder station for international radiograms and from 1943 it was used as an alternative station for international shortwave radio messages.

In summary, the site encompasses an era in technology, from the earliest establishment of wireless communications prior to the first World War until the introduction of world wide communications using satellites. Almost the whole of the original premises remain in a 'close to original' state. These are located on a site that has significant recreational importance as an open parkland within a well-established urban area; it incorporates a heritage trail, a public museum of telecommunications, viewing platforms and other public facilities, and is well patronised by the public.

The following document is attached in support of the nomination:

'A History of Wireless Hill, Melville 1912-1967'
M.J. Cullity, B.E., M.B.A., FIEAust, F.I.E.E. (6/1/1990)

The following document is referred to in support of the nomination:

'All the News in a Flash - Rottnest Communications 1828 - 1978'
John Moynihan 1988, ISBN 0 908 421 21 E The Institution of Engineers, Australia.

The nomination has been discussed with the owner of the site, the City of Melville.

The City have agreed to maintain the Plaque as part of its normal upkeep of the site. It is also prepared to sponsor a suitable plaquing ceremony.

This submission has been endorsed by the Division Committee of the Western Australia Division at its monthly meeting in July 1994.

In the event of this nomination being approved the W.A. Division Heritage Panel will organise a suitable presenting/unveiling ceremony to be conducted during the National Engineering Week in September 1994.

Chairman, Heritage Panel

Secretary Heritage Panel

H 7/4.

ENGINEERING HERITAGE PANEL.

Monday 15th August 1994.

Dr Don J. Fraser,
Chairman, The Commemorative Plaque Sub-Committee- I. E. AUST. N.O.
National Engineering Heritage Committee,
The Institution of Engineers, Australia.
11 National Circuit,
BARTON...ACT....2600.

22 AUG 1994

3/6/93

The
Institution
of Engineers,
Australia

WESTERN AUSTRALIA
DIVISION

Per Robert Breen, Associate Director Engineering,

Perth Wireless Station.

Dear Don, Application for an Historic Engineering Marker.

Further to my letter of 9th August 1994, I have today received a copy of a fax that Rob Breen has this day sent to Tony Moulds which included your suggested wording for the plaque. I have looked at this again and now submit a further draft for your approval, this time limiting it to a total of 70 words including the title "Perth Wireless Station".

"PERTH WIRELESS STATION."

On 30th September 1912, eighteen years after Marconi's first radio experiments, the Australian Postmaster General's Department commissioned this radio station, equipped with a Telefunken 25kw, quenched-spark long-wave transmitter, coupled to a 120 metre high guyed aerial.

It established the first direct radiotelegraphic communication across the continent and maintained contact with shipping.

Between 1922 and its 1967 decommissioning, it also linked Australia to the world by short-wave radio.

Dedicated by

The Institution of Engineers, Australia. 1994.

(70 words)

If one extra word is allowed, then I suggest that we add the word "coastal" between the words "this" and "radio" in the first sentence.

You will note that I have again included the actual date of commissioning of this station. I think this is important as it shows where this fitted in to the chronological sequence of the opening of the other stations. They were, Melbourne (Feb 1912), Hobart (Mar 1912), Pennant Hills, NSW (19 Aug 1912), Brisbane 2 Sept 1912) and Adelaide (1 Oct 1912). Only Perth and Pennant Hills were of 25kw capacity, the others were only 5kw capacity.

In your draft, your last sentence uses the date 1912, being the commissioning year. However, it only became a short-wave station in 1922; hence my reason for changing this date.

The earlier reference to the four other stations, that were commissioned earlier in the same year, is, I think, really rather superfluous when compared with the rest of the information that we are trying to document on the plaque within the 70-word limit.

I also feel that it is important to mention that the station was "decommissioned" in 1967.

We are hoping to have the plaquing ceremony on Friday 9th September during "Engineers Week", being performed by our President, Professor Doug Clyde.

Yours sincerely

Bruce J.

Bruce James.

IEH40815.



First Draft.

"PERTH WIRELESS STATION."

Eighteen years after Marconi's first radio transmission, the Australian Post Master General's Department commissioned this coastal radio station in 1912, being one of five around the continent at that time.

It established the first direct telegraphic communication across Australia and with off-shore shipping.

The original Telefunken 25kw quenched-spark long-wave transmitter was connected to a 120 metre high guyed aerial.

Between 1922 and its 1967 decommissioning, it linked Australia to the world by radio.

(76 words)

Dedicated by
The Institution of Engineers, Australia. 1994.

Alternative wording suggested by Prof. Ray Whitmore.

" PERTH WIRELESS STATION."

"In 1912, eighteen years after Marconi's first radio transmission, the Australian Post Master General's Department commissioned this coastal radio station.

It was one of five in Australia and was equipped with a Telefunken 25kw quenched-spark long-wave transmitter, coupled to a guyed aerial, 120 metres in height.

The station maintained contact with off-shore shipping and established the first direct telegraphic communication across the continent.

Between 1922 and its decommissioning in 1967 it linked Australia to the world by radio."

(81 words)

Alternative wording suggested by Deane Kemp.

" PERTH WIRELESS STATION."

"This radio station, commissioned in 1912 only 18 years after Marconi's first radio transmission, was one of the first 5 coastal radio stations around Australia.

It provided the first direct telegraphic communication between Perth and Sydney and was part of a coastal radio network aiding maritime safety.

The first direct radio link across the Indian Ocean was established here in 1925. associated with important developments in wireless telegraphy, this station linked Australia to the world until its decommissioning in 1967"

(83 words)

(It needs "word smithing" & resolve any confusion between "wireless" & "radio")

Second Draft.

" PERTH WIRELESS STATION. "

On 30th September 1912, eighteen years after Marconi's first radio experiments, the Australian Post Master General's Department commissioned this coastal radio station.

It was one of five in Australia and was equipped with a Telefunken 25kw quenched-spark long-wave transmitter, coupled to a 120 metre high guyed aerial.

The station maintained contact with off-shore shipping and established the first direct radiotelegraphic communication across the continent.

Between 1922 and its decommissioning in 1967, it also linked Australia to the world by short-wave radio. "

(84 words)

Words suggested by Don Fraser.

" PERTH WIRELESS STATION.

In 1912, eighteen years after Marconi's first radio experiments, the Post Master General's Department commissioned this coastal radio station, equipped with a Telefunken 25kw quenched-spark long-wave transmitter, coupled to a 120 metre guyed aerial.

One of five in Australia, it maintained contact with off-shore shipping and established the first radiotelegraphic communication across the continent.

From 1912 to 1967, it linked Australia to the world by radio. "

(72 words)

Tony Mould's suggested wording.

" PERTH WIRELESS STATION.

In 1912, eighteen years after Marconi's first radio experiments, the Postmaster General's department commissioned this coastal radio station.

One of the largest in Australia, equipped with a Telefunken 25kw quenched-spark long-wave transmitter coupled to a 120 metre high guyed aerial, it maintained contact with off-shore shipping and established the first direct radiotelegraphic communication across the continent.

From 1922 to 1967, it also linked Australia to the world by radio.

(75 words)

Third Draft.

" PERTH WIRELESS STATION. "

On 30th September 1912, eighteen years after Marconi's first radio experiments, the Australian Postmaster General's Department commissioned this radio station, equipped with a Telefunken 25kw quenched-spark long-wave transmitter, coupled to a 120 metre high guyed aerial.

It established the first direct radiotelegraphic communication across the continent and maintained contact with shipping.

Between 1922 and its 1967 decommissioning, it also linked Australia to the world by short-wave radio. "

(70 words)



HISTORIC ENGINEERING MARKER

PERTH WIRELESS STATION

ON 30 SEPTEMBER 1912, EIGHTEEN YEARS AFTER MARCONI'S FIRST RADIO EXPERIMENTS, THE AUSTRALIAN POST MASTER GENERAL'S DEPARTMENT COMMISSIONED THIS COASTAL RADIO STATION, EQUIPPED WITH A TELEFUNKEN 25KW, QUENCHED-SPARK LONG-WAVE TRANSMITTER, COUPLED TO A 120 METRE GUYED AERIAL. IT ESTABLISHED THE FIRST RADIOTELEGRAPHIC COMMUNICATION ACROSS THE CONTINENT AND MAINTAINED CONTACT WITH SHIPPING. BETWEEN 1922 AND ITS 1967 DECOMMISSIONING, IT ALSO LINKED AUSTRALIA TO THE WORLD BY SHORT-WAVE RADIO.

DEDICATED BY

THE INSTITUTION OF ENGINEERS, AUSTRALIA 1994

16"

MODEL



HISTORIC ENGINEERING MARKER

THE FURPHY WATER CART

IN 1878 JOHN FURPHY INVENTED THE FURPHY WATER TANK WITH THE CAST IRON ENDS SEALED BY HEAT SHRUNK IRON BANDS. THESE OUTSTANDING EXAMPLES OF EARLY AGRICULTURAL ENGINEERING INGENUITY WERE WIDELY USED THROUGHOUT RURAL AUSTRALIA. THE TERM "FURPHY" BECAME A SYNONYM FOR SUSPECT INFORMATION & RUMOR DURING WORLD WAR I WHEN DRIVERS OF HORSE DRAWN WATER CARTS SERVICING AUSTRALIAN TROOPS, CARRIED INFORMATION & GOSSIP BETWEEN CAMPS. THE TANKS ARE STILL MANUFACTURED AT THE SHEPPARTON WORKS.

DEDICATED BY

THE INSTITUTION OF ENGINEERS, AUSTRALIA, 1985.

12"

HER/4.

ENGINEERING HERITAGE PANEL.

27th July 1994.

I.E. Aust. N.O.

- 2 AUG 1994

Dr Don J. Fraser.
Chairman,
The Commemorative Plaque Sub-Committee,
National Engineering Heritage Committee,
The Institution of Engineers, Australia,
11 National Circuit,
BARTON...ACT...2600.

File.....



Per Robert Breen: 2/8/94
Executive Officer.

Perth Wireless Station.
Application for an Historic Engineering Marker.

Dear Don,

Please find enclosed an application for an Historic Engineering Marker Award for the Perth Wireless Station which was commissioned in 1912.

We are very keen to have this application processed as quickly as possible as it is intended to have the President of the Institution, Professor Doug Clyde, to make the presentation during Engineering Week 1994 on Thursday 8th September. This will mean that the invitations for the ceremony will need to be posted out by about 15th August.

I am sending a copy of the resource document which is fairly bulky and may be of use to the Plaquing sub-Committee but I feel that the submission is really self contained.

Please do let me know if there is any further information required.

Yours sincerely,

Bruce James.
Chairman,
Engineering Heritage Panel.

IEH40726.



COMMEMORATIVE PLAQUE NOMINATION

To: Commemorative Plaque Sub-Committee
The Institution of Engineers, Australia
11 National Circuit
BARTON ACT 2600

From: Engineering Heritage Panel
W.A. Division

The following work is nominated for an Historic Engineering Marker Award:

Name: Perth Wireless Station

Location: Wireless Hill Park
Almondbury Road,
Ardross
(Crown Reserve 29813 Lat. 32 02'00"S, Long. 115 49'30"E)
Western Australia

Owner: City of Melville
Almondbury Road
Ardross
(PO Box 130
Applecross WA 6153)

In support of the nomination the following information is provided:

Proposed wording on HEM:

PERTH WIRELESS STATION

Eighteen years after Marconi's first radio transmission, the Australian Post Master General's Department commissioned this coastal radio station in 1912, being one of five around the continent at that time.

It established the first direct telegraphic communication across Australia and with off-shore shipping.

The original Telefunken 25kw queneched arc long wave transmitter was connected to a 120 metre high guyed aerial.

Between 1922 and its 1967 decommissioning, it linked Australia to the world by radio.

Dedicated by
The Institution of Engineers, Australia. 1994

Justification:

The site is located in the Perth suburb of Ardross adjacent the Canning Highway between Fremantle, 7km to the west and Perth, 8km to the north. The site, called Applecross Wireless Hill Park, is now a public reserve vested in the City of Melville. As a public park, including the buildings, it is now used for a number of community purposes including a Telecommunications Museum. The site is classified by the National Trust of Australia (WA).

The buildings on the site remain intact and date from the commencement of the station in 1912. The three buildings at the crest of the hill were the operators' building, the engine house and the store. At the bottom of the hill near the Canning Highway are a group of four dwellings which housed the operating and maintenance staff. Also remaining on the site is the central concrete foundation for the 120m mast and the three concrete anchor blocks for the mast guy wires. The only remaining parts of the wireless equipment on display at Wireless Hill are a large antennae coil former and a broken glass insulator disc from the base of the mast.

The buildings, roads and foundation were constructed by the Architectural Division of the Public Works Department of Western Australia. The supply of plant and erection of the 120m mast was undertaken by the Australian Wireless Company. The original wireless equipment was a crystal receiver using local galena ore and a 25kw quenched arc transmitter supplied from Germany by Telefunken. It was powered by a 60hp Gardiner engine driving a 50 cycle alternator.

Operations began under the control of the Postmaster General's Department. The Australian navy took control during World War 1, and installed a 60 KW Poulsen arc transmitter and valve operated receivers. Soon after 1916, power was obtained from the metropolitan supply at 20KV through a 75 KVA transformer to produce 400V. Control returned to the PMG Department in 1920, passing to AWA in 1922, who installed valve transmitters. Generating machinery was removed from the power house building in 1942, and the building became the transmitter hall. The operating staff moved to Bassendean in 1943, where they were placed in a concrete bunker, and returned to Applecross in 1946, when all the transmitting and receiving equipment still remained in the original power house building.

Control of the station moved to the Overseas Telecommunications Commission in 1947, who moved the receiving equipment to Bassendean and the transmitter operators to the old cable station at Mosman Park. Two rhombic antennae were used for the NASA Space Mission communication in 1960, and the 120m mast was replaced by a shorter mast of 46m in 1962. OTC vacated the site in 1967, and control of the site with its buildings passed to the City of Melville. The original transmitter building became the caretaker's residence, and original power house building the Wireless Museum, and the store building a community meeting hall and the control centre for the State Emergency Service.

The Perth Station, with its sister station at Pennant Hills in Sydney, was set up to establish direct wireless telegraphy communication across Australia from 1912. These stations together with smaller coastal stations in Melbourne, Hobart and Brisbane also formed an important link in a network of coastal shipping communications wireless stations established around the Australian coastline just prior to the first World War, and commanded the seaward approach on the western side of the continent. This greatly improved the safety of ships at sea around the Australian coast. The Station took on a larger international role in about 1925, both serving as a feeder for traffic to eastern states international services and for direct wireless links across the Indian Ocean. Additionally, about the same time, AWA installed a 5KW coastal service transmitter for radiograms; equipment for police communication VK-I, and a short wave broadcasting station VK6-ME. Nicholsons Ltd, who were the local agent for AWA, began commercial broadcasting with a 'B' Class transmitter 6PR of 500W in 1931.

Perth Wireless Station commenced operation just sixteen years after Marconi first demonstrated wireless telegraphy from the Post Office in London, sending messages over a distance of about twelve miles. Therefore the Station has an important place in technological history.

The station also has strong associations with important developments in wireless telegraphy and broadcasting in Australia and the development of Amalgamated Wireless Australia (AWA) and the Overseas Telecommunications Commission (OTC). The station was used continuously from 1912 to 1967 as the main coastal radio communications centre for the State. In the 1920's it became a feeder station for international radiograms and from 1943 it was used as an alternative station for international shortwave radio messages.

In summary, the site encompasses an era in technology, from the earliest establishment of wireless communications prior to the first World War until the introduction of world wide communications using satellites. Almost the whole of the original premises remain in a 'close to original' state. These are located on a site that has significant recreational importance as an open parkland within a well-established urban area; it incorporates a heritage trail, a public museum of telecommunications, viewing platforms and other public facilities, and is well patronised by the public.

The following document is attached in support of the nomination:

'A History of Wireless Hill, Melville 1912-1967'
M.J. Cullity, B.E., M.B.A., FIEAust, F.I.E.E. (6/1/1990)

The following document is referred to in support of the nomination:

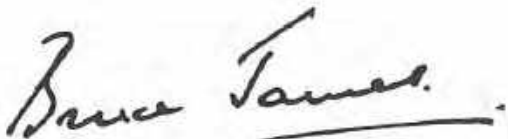
'All the News in a Flash - Rottnest Communications 1829 - 1979'
John Moynihan 1988, ISBN 0 909 421 21 8 The Institution of Engineers, Australia.

The nomination has been discussed with the owner of the site, the City of Melville.

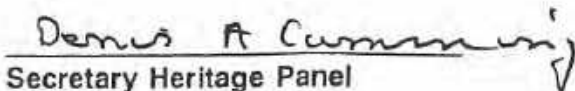
The City have agreed to maintain the Plaque as part of its normal upkeep of the site. It is also prepared to sponsor a suitable plaquing ceremony.

This submission has been endorsed by the Division Committee of the Western Australia Division at its monthly meeting in July 1994.

In the event of this nomination being approved the W.A. Division Heritage Panel will organise a suitable presenting/unveiling ceremony to be conducted during the National Engineering Week in September 1994.



Chairman, Heritage Panel



Secretary Heritage Panel

theses, a book that has not survived but that can be reconstructed in part from Tertullian's *Against Marcion*.

The existence of such churches compelled the catholic church to take Marcion very seriously. After the earlier skirmishes, such as Justin Martyr, Irenaeus attacked him, among the gnostics, in *Against the Heresies* (c. 185), as did Tertullian in his longest work, *Against Marcion* (c. 207), and elsewhere. It was easy to attack his arbitrary treatment of the text of those books which he himself accepted as Scripture, to press against him the argument from history and prophecy and to assert the necessary unity of the God of creation and redemption, the goodness of matter as God's creation and, therefore, the full reality of Christ's humanity (technically, Marcion's Christology was not only docetic but also dualist, the Son being conceived as no more than a manifestation of the Father); but also, if the church was to reject the dualism of good and evil (or imperfect) gods or of God and matter, the answer to the problem of evil, it had to develop its alternative solution. Hence the renewed emphasis upon the doctrine of the Fall evident in Irenaeus, Tertullian and Origen. Further, Marcion's misuse of St. Paul had to be countered by an even deeper interpretation of his essential message. This was largely provided by Irenaeus. Tertullian also emphasized the redemption of creation (including the resurrection of the flesh) and brought the continuity of sacred history: the good God had not been absent from his creation before the Incarnation. Marcion's canon reduced a crystallization of the church's own, with apostolic authority as the criterion. Paul, of course, was accepted, but so were Peter and John. Other Gospels with apostolic authority were set with St. Luke's; and further attention was drawn to the importance of the apostles by the inclusion of Acts. More generally, apostolicity was advanced as a principal mark of the true church in reply to Marcion and to other gnostics who took too much account of history and of tradition or who claimed to have received revelations of their own. The church appealed to the apostolic writings and to the tradition preserved in churches of apostolic origin, seen in worship and in the apostolic rule of faith and order by the bishops in manifest succession of office in each church—often, it was believed, from the days of the apostles themselves. Marcion did not create catholicism by causing a schism; in reaction to himself, which would not otherwise have occurred: the concept of canonicity, respect for apostolic tradition, creeds and an authoritative ministry were none of them his. Rather he quickened the pace of the movement toward the presentation of "the catholic church" which is worked out in, for instance, Tertullian's *De praescriptione haereticorum*. That dangers of excessive rigidity, traditionalism and institutionalism were not completely avoided is probable; and Montanism may be interpreted as in part a reaction from these aspects of catholicism. (See also Gnosticism.)

Marcionite churches spread rapidly through the empire, but the movement lost impetus in the west before the 3rd century was over. Probably merged into Manichaeism (q.v.). That they flourished in the east was shown by Cyril of Jerusalem (c. 350), who supposed that any city may contain a Marcionite conventicle; Eusebius of Caesarea (in the middle of the 4th century), who led many Marcionites in his diocese; and by Eusebius's writings on those in Armenia. Clear traces of Marcionism proper were found in the 7th century, but the dualism of the Marcionites, their rejection of the flesh and their asceticism reappeared in other forms, such as the Paulicians and Bogomils, as well as in the later heresies. More modern tendencies among Christians to distrust the Old Testament are often called Marcionism, while theologians distrust natural theology and natural law sometimes in terms which recall those of Marcion himself.

—The chief ancient authorities are Irenaeus and Tertullian, cited above. Modern study is based on A. von Harnack, *Das Evangelium vom fremden Gott*, no. 45 of *Texte und Studien zur Geschichte der christlichen Literatur* (1921, 1924), with his *Neue Studien zu Marcion* (1923) in which he criticizes Harnack's views and drew attention to Marcion's influence, but overstated them. See also E. C. Blackman, *Marcion and His Influence* (1948, 1950); also John Knox, *Marcion and the Testament* (1942). (S. L. G.)

MARCOMANNI, the name of a Suevic tribe "men of the mark, or border." They were often in conflict with the Roman empire, and gave their name to the Marcomannic war, a struggle waged by the emperor Marcus Aurelius against them. The Marcomanni disappeared from history during the 4th century, being probably merged in the Baiouarii, the later Bavarians.

See SUEBI; and E. Devrient, "Hermunduren und Markmannen" in *Neues Jahrb. f. das klassische Altertum* (1901), 51.

MARCONI, MARCHESE GUGLIELMO (1874–1937), Italian physicist, the inventor of a practical system of communicating intelligence without the use of connecting wires between sending and receiving points, was born in Bologna on April 25, 1874, the son of an Italian country gentleman who had married the daughter of Andrew Jameson of County Wexford, Ire. Educated first in Bologna and later in Florence, Marconi then went to the technical school of Leghorn, where he studied physics under Vincenzo Rosa and had every opportunity of investigating electromagnetic (or Hertzian) wave technique, following the earlier mathematical work of Clerk Maxwell and the experiments of Heinrich Hertz, Edouard Branly, Oliver Lodge, Augusto Righi and others.

In 1894, Marconi began experimenting at his father's estate in Pontecchio, near Bologna, using comparatively crude apparatus: an induction coil with a spark discharger controlled by a Morse tapping key, at the sending end and a simple filings coherer at the receiver. After preliminary experiments over a short distance, he first improved the coherer and made it self-restoring in operation; then, by systematic tests, he showed that the range of signalling was increased by using a vertical aerial with a metal plate or cylinder at the top of a pole connected through the spark gap to a similar plate on the ground. In this way, the range of signalling was increased to about 1½ mi., and Marconi had convinced himself of the importance of this new system of communication. It was at this period also that he conducted some simple experiments with reflectors around the aerial to concentrate the radiated electrical energy into a beam instead of spreading it in all directions.

As he received little encouragement to continue his experiments in Italy, he was advised by his mother's relations to go to England; and in Feb. 1896 he arrived in London and met William Preece, engineer in chief of the post office, who offered him every assistance and encouragement. Marconi filed his first patent in England in June 1896 and, during that and the following year, he gave a series of successful demonstrations in some of which he used balloons and kites to obtain greater height for his aerials. He was able to send signals over distances up to 4 mi. on Salisbury plain and to nearly 9 mi. across the Bristol channel. These tests, together with Preece's lectures on them, attracted considerable publicity both in England and abroad; and, in June 1897, Marconi went to Spezia, where a land station was erected and communication was established with Italian warships at distances up to 12 mi.

There was, however, still a good deal of scepticism about the useful application of this means of communication and lack of interest in its exploitation. But Marconi's cousin Jameson Davis, a practising engineer, financed his patent and was instrumental in the formation of the Wireless Telegraph and Signal Co., Ltd., the name of which was changed in 1900 to Marconi's Wireless Telegraph Co., Ltd. John Ambrose Fleming, who was to patent the first two-electrode thermionic valve in 1904, became scientific adviser to the company, the efforts of which for some time were devoted to assisting Marconi in his continuous endeavour to show to the full the possibilities of this new means of communication. A further step was taken in 1899, when a wireless station was established at South Foreland for communicating with Wimereux in France, a distance of 31 mi., and in the same year British battleships had exchanged messages at 75 mi.

In Sept. 1899, Marconi equipped two U.S. ships to report to newspapers in New York city the progress of the yacht race for the America cup. This was another great success, which aroused world-wide excitement and led to the formation of the American Marconi company. The following year the Marconi International Marine Communication Co., Ltd., was established for the purpose

MARCUS—MARCUS AURELIUS ANTONINUS

of installing and operating services between ships and land stations. In 1900 also, Marconi filed the famous patent No. 7777 for "Improvements in Apparatus for Wireless Telegraphy." This was based on the earlier work of Sir Oliver Lodge in tuning wireless transmitters and receivers, which enabled several stations to operate on different wave lengths without mutual interference.

Marconi's great triumph was, however, yet to come. In spite of the opinion expressed by some distinguished mathematicians that the curvature of the earth would limit practical communication by means of electric waves to a distance of 100-200 mi., Marconi succeeded in Dec. 1901 in receiving at St. John's, Nfld., signals transmitted across the Atlantic ocean from Poldhu in Cornwall. This achievement created an immense sensation in every part of the civilized world; and, though much remained to be learned about the laws of propagation of radio waves around the earth and through the atmosphere, it was the starting point of the vast development of radio communications, broadcasting and navigation services that took place in the next 50 years, in much of which moreover Marconi himself continued to play an important part.

During a voyage on the U.S. liner "Philadelphia" in 1902, Marconi received messages from distances of 700 mi. by day and 2,000 mi. by night. He thus first discovered the fact that, because some radio waves travel by reflection from the upper regions of the atmosphere, the conditions of transmission or propagation are sometimes more favourable at night than during the hours of daylight. It was in 1902 also that Marconi patented the magnetic detector; and during the next three years he developed and patented the horizontal directional aerial. Both of these devices improved the efficiency of the communication system. In 1910, assisted by H. J. Round, he received messages at Buenos Aires, Arg., from Clifden in Ireland over a distance of about 6,000 mi., using a wave length of about 8,000 m. In 1912 he introduced the timed-spark system of generating pseudocontinuous waves in place of the damped trains of waves produced by the older spark transmitters. This effected a considerable improvement in the selectivity of transmission and reception with a further gain in efficiency. The system was used for several years at many important long-distance stations; and by its means Marconi sent the first messages ever transmitted by wireless from England to Australia, in Sept. 1918.

In spite of the rapid and widespread developments then taking place in the various aspects of wireless and its applications to communication, to navigation and to the safety of life at sea, Marconi's intuition and urge to experiment toward greater accomplishments were by no means exhausted. It was in 1916, during World War I, that he saw the possible advantages of electric waves, shorter than those used before. For example, the shorter waves permitted the use of reflectors round the aerial, which in wartime minimized the interception of the transmitted signals by the enemy and also effected an economy in signalling. After tests in Italy (20 years after his original experiments with reflectors), Marconi continued the work in Great Britain with C. S. Franklin and, on a wave length of 15 m., received signals over a range of 20-100 mi. In 1923 the experiments were continued with G. A. Mathieu on board the steam yacht "Elettra," which had been specially fitted up. From a transmitter of 1 kw. at Poldhu, signals were received at a distance of 1,400 mi., much louder than those from Caernarvon on a wave length several hundred times as great and with 100 times the power at the transmitter. Thus began the development of short-wave wireless communication which, with the use of the beam aerial system for concentrating the energy in the desired direction, constitutes the basis of nearly all modern long-distance radio communication. It was in 1924 that the Marconi company obtained a contract from the post office for the establishment of short-wave communication between England and the countries of the British Commonwealth.

A few years later Marconi returned to the study of still shorter waves and, with the aid of valve-oscillator technique, examined the range possibilities of wave lengths of about half a metre. At these very short wave lengths, a parabolic reflector of moderate

size gives a considerable increase in radiated power in direction, and experiments conducted off the coast of the yacht "Elettra" soon showed that useful ranges of communication could be achieved with small powers at the transmitter. Marconi installed a very short-wave radio telephone between the Vatican and the pope's palace at Castel Gandolfo; later work, Marconi once more demonstrated that even waves as short as 35 cm. are not limited in range to the normal distance between transmitter and receiver.

Marconi received many honours and several honours; he was created a knight of Italy (1902); made a freemason (1903); awarded half the Nobel prize for physics (1909); of the Royal Society of Arts and, in the United States, the Lin and John Fritz medals (1909); appointed an honorary Cross of the Victorian Order (1914); sent as plenipotentiary to the peace conference in Paris (1919), in which he signed the peace treaties with Austria and with Bulgaria; he was nominated to the Italian senate (1920); president of the Royal Italian Academy (1930); died in Rome on July 20, 1937, and was accorded a state funeral by the Italian government. At his own wish, he was buried in the town of Bologna.

MARCUS, SAINT, pope in 336 (Jan. 18-Oct. 10). His other sources claim, from 337 to 340, is credited with establishing the right of bishops of Ostia to consecrate. He also is said to have founded the present church of St. Peter in Rome, and another over the Catacomb of Balbina, but alleged to have been sent by him to Athanasius is now regarded as spurious.

His feast day is Oct. 7.

MARCUS AURELIUS ANTONINUS (121-180), emperor and Stoic philosopher, was born in Rome and date of his birth being variously stated as April 6, 121. His original name was Marcus Annianus Verus. His father Verus (prefect of the city and thrice consul), who came of an Italian stock, had received patrician rank from Vespasian and was three months old when his father died, and was adopted by his grandfather. Hadrian adopted, as his son, Titus Antoninus Pius (uncle of Marcus), on condition that he turn adopt both Marcus (then 17) and Lucius Ceionius Commodus, the son of Aelius Caesar, who had originally been adopted by Hadrian as his successor, but had died before him. He had been, at the age of 15, betrothed to Fabia, the sister of Marcus; the engagement was broken off by Antoninus Pius, who was betrothed to Faustina, the daughter of the latter. The title of Caesar was conferred upon him and he dropped the name of Verus. The full name he then bore was Marcus Aelius Antoninus, Aelius coming from Hadrian's family, and Antoninus, Aelius coming from Hadrian's family, and being the original name of Antoninus Pius. In 140 he was consul. He was educated, not at school, but by tutors, H. Atticus and M. Cornelius Fronto (*q.v.*), in the usual curriculum of rhetoric and poetry; but Stoicism attracted him from the start, and at 25 he definitely abandoned Fronto, whose training was wholly literary, to learn philosophy under Rusticus the Stoic, law under L. Volusius Moecianus. A Stoic he remained in practice, but retained the humanity of his disposition.

Emperor.—Antoninus Pius died in 161, having recommended as his successor Aurelius, then 40 years of age, without mentioning Commodus, his other adopted son, commonly called Elagabalus. It is believed that the senate urged Aurelius to take sole administration. But he admitted Verus as his partner, giving him the tribunician and proconsular powers, and the titles Caesar and Augustus. In the first year of his reign Faustina gave him twins, one of whom became the emperor Commodus.

Aurelius' reign was largely occupied in defending the empire against attacks from all sides. First of all the Parthians and Vologeses III broke into Syria. Verus went out in nominal command of the war against them, which was really conducted by Avidius Cassius. The war was concluded in 165, but the returning army brought a pestilence with them that spread over the whole empire. Aurelius accompanied Verus in wars in Pannonia and Noricum in 167-8, and peace was made with the